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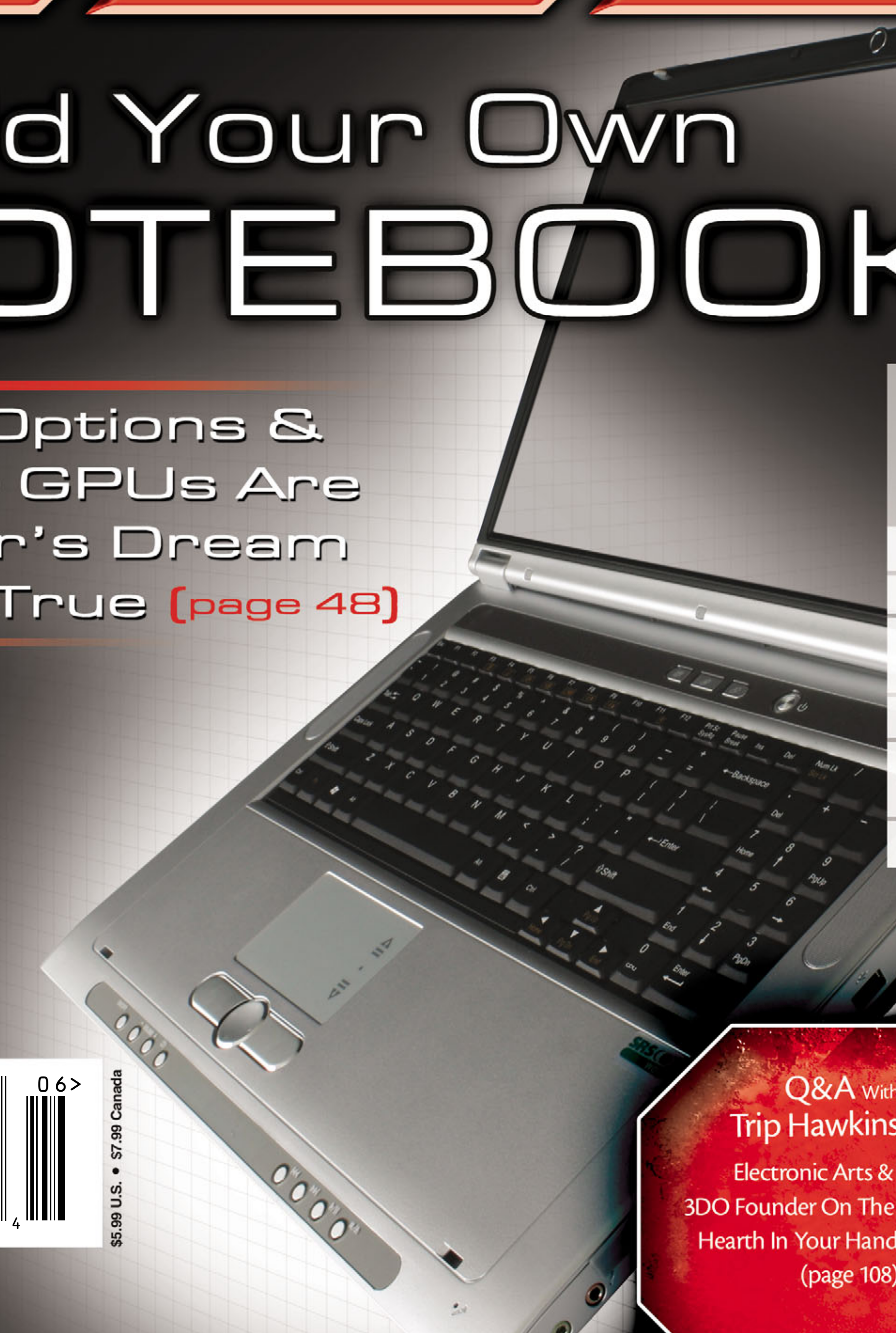
Hitachi Deskstar 7K1000 1TB (page 19)

Hard Drive Comparo: New Places To Keep All Your Stuff (page 24)

Integral Technologies ElectriPlast: Plastic Goes High-Tech (page 42)

CPU Goes To The Movies: A Look Inside Robert Rodriguez's Troublemaker Studios (page 44)

Build Your Own NOTEBOOK



More Options & Better GPUs Are A DIYer's Dream Come True (page 48)

Check Out Our Portable Powerhouse
(page 56)

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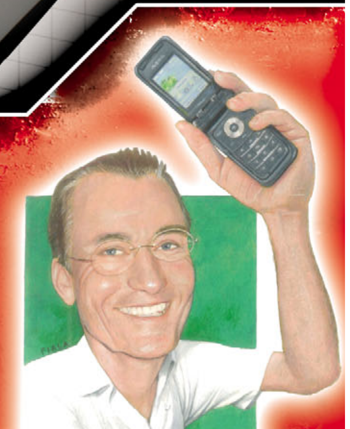

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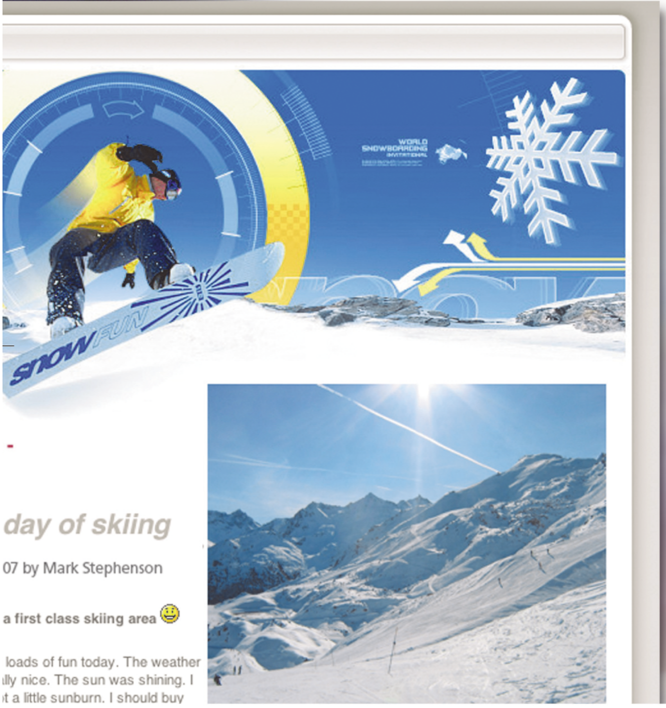
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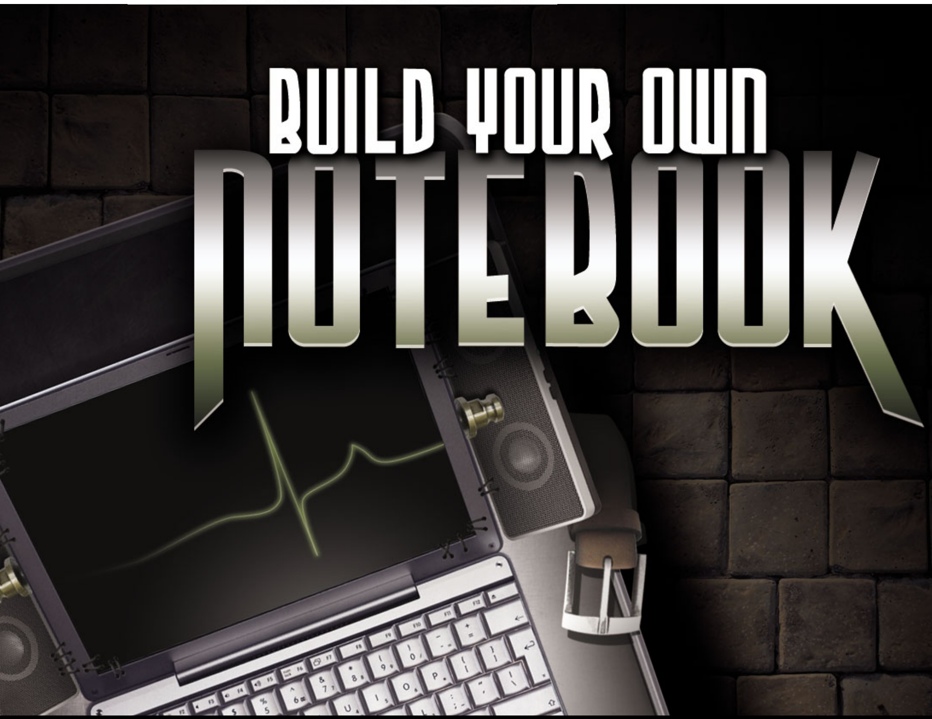


Spotlight

48 **The Homebrew Laptop**
Build Your Own Potent Portable

50 **Parts & Parcel**
The Notebook Builder's Essential Shopping Guide

56 **Some Assembly Required**
Tower Power In A Mobile Package

64 **Power User Accessories**
Give Your Notebook An Accessory Boost

Frontside

8 **What's Happening**
14 **Digital Economy**
16 **The Saint**
The New World Of Downloadable Gaming

The Experts

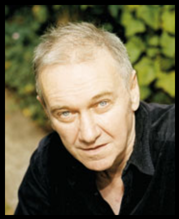
Alex St. John
The Saint
Page 16

Alex "Sharky" Ross
The Shark Tank
Page 34

Anand Lal Shimpi
Anand's Corner
Page 33

Barry Brenesal
The Cutting Edge
Page 94

Rob "CmdrTaco" Malda
The Department Of Stuff
Page 87


Mike Magee
Shavings From The Rumour Mill
Page 100

Rahul Sood
Wagging The Dog
Page 101

Pete Loshin
Open Sauce
Page 83

Chris Pirillo
Dialogue Box
Page 82

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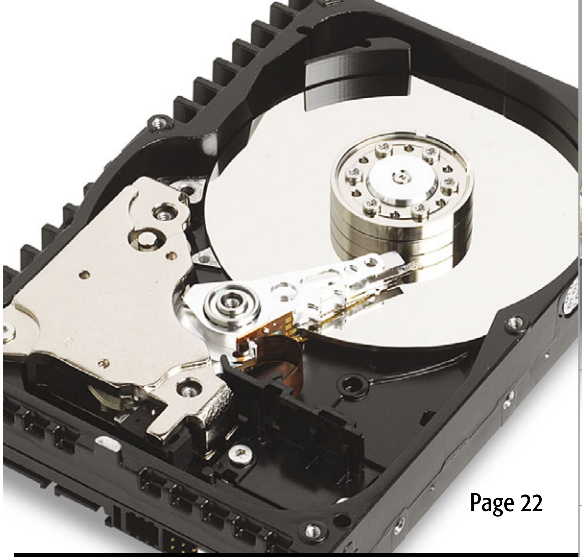

Page 22

Heavy Gear

17 **Dream Hardware**

18 **Your Next Data Vault**
Hard Drives For Desktops & More

24 **High-Speed DDR2 Deathmatch**
1,066MHz & Beyond!

28 Philips TripleWriter SPD7000BD
HP Media Vault 2020

29 Asus P5B Premium Vista Edition
Gigabyte GA-N680SLI-DQ6

30 Creative Sound Blaster X-Fi
XtremeGamer Fatal1ty Pro
Synology DS207

32 Asus EN8800GTS 320MB
Autumnwave OnAir Creator

33 **Anand's Corner**
AMD & Intel Outline The Next Two Years

34 **The Shark Tank**
Widescreening 1.0

Page 28

Hard Hat Area

PC Modder

35 **Tips & Tutorials**
36 **G80 Overclocking**
Making The Fast Go Faster

40 **Advanced Q&A Corner**
42 **X-Ray Vision: ElectriPlast**
A New Twist On Plastic
44 **White Paper: Troublemaker Digital**
The Crew That Put The Grind
In "Grindhouse"

Loading Zone

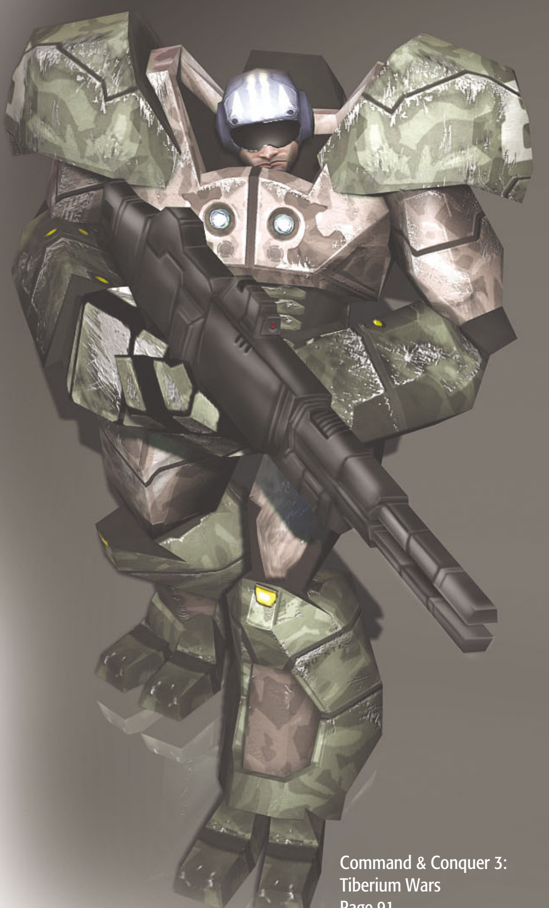
68 **The Bleeding Edge Of Software**
Inside The World Of Betas
69 **Up To Speed**
Upgrades That'll Keep You
Humming Along
70 **Microsoft Office 2007**
It's Time For An Upgrade
76 **PDF Creation Tools**
You Get What You Pay For
80 i-Lighter, Inc. i-Lighter
DS Development Bells &
Whistles For Outlook 3.0
81 ChemTable.com Software Reg
Organizer 4.0
Bytescout Software Development
SWF Printer Pro
82 **Dialogue Box**
A Volume Of Vista Vents
83 **Open Sauce**
Diary Of A Perpetually Distracted Man

Caught In The Web

84 **Our-Fi**
Municipal Wireless Searches For
Its Connection
87 **The Department Of Stuff**
desktop.txt

Digital Living

88 **Road Warrior**
New Sony Digicams, Mobile Power
From Tekkeon, New Fujitsu
Laptops & More
90 **At Your Leisure**
Games, Gear, Movies & Music
94 **The Cutting Edge**
Machines That Write! Film At 11, Part 1


Command & Conquer 3:
Tiberium Wars
Page 91

Tips & Tricks

96 **Software Tips & Projects**
Road Rules
98 **Warm Up To Penguins**
A Sweet Vintage For Windows Programs

What's Cooking

100 **Shavings From The Rumour Mill**
7-Inch Connected UMPC A PC Dream
101 **Wagging The Dog**
Staying Afloat In A Challenging Business
103 **Technically Speaking**
An Interview With David J. Ernst, CIO Of
California State University
106 **Under Development**
A Peek At What's Brewing
In The Laboratory

Back Door

108 **Q&A With Trip Hawkins**
Electronic Arts & 3DO Founder On The
Hearth In Your Hand

Infinite Loops

Strange stats and other oddball
items from computing's periphery

86, 97, 99

EDITOR'S NOTE

CPU isn't a gaming pub, but many of us who work on it each month play games, and from your email and forum posts it seems clear that many of you do, too. So I'm going to indulge my inner gamer this month and get something off my chest that's been bothering me for some time.

One of the topics we gamers most enjoy debating is the PC vs. console question: Which is better? Former *CPU* editor Samit and I have spent many an evening hashing this issue out, although both of us play PC games and console games in nearly equal measure. In the end, the truth lies somewhere in the middle, as it so often does. PCs and consoles each have huge lists of pros and cons where gaming is concerned, and for some of us there's just too much good stuff on both sides of the fence to ignore either one.

Unfortunately, though, one of the longtime advantages of console gaming, the consistency and uniformity of each platform, is under attack of late, and its assailants are the very people who would benefit most from it. You see, in the good ol' days, you could purchase the console of your choice and rest in the knowledge that for about five years or so your machine would be identical to everyone else's and would play every game published for it with equal aplomb. Perhaps more importantly, developers knew exactly what hardware you had under the hood and could optimize their code to run on precisely that specification, never having to wonder how many people had access to what kinds of storage, or whether coding for Wi-Fi functionality was worth the effort.

Thanks to Sony and Microsoft, these things are no longer assumed. Both companies elected to offer two variants of their most recent console offerings at launch: a more expensive but full-featured version, and a stripped-down, budget-friendlier version (Sony has since stopped offering its 20GB PS3 in the United States).

Both companies talked a lot about how they were championing consumer choice by offering multiple console versions, but in the old days choice meant deciding if you wanted one controller or two and a pack-in game, not whether you could live without a hard drive. Microsoft and Sony clearly wanted budget SKUs around so they could point to a lower cost of entry, but in the cases of both the Xbox 360 and the PS3, the higher-priced unit was a much better buy. Bottom line, people who bought the cheapie versions got a raw deal, especially in the case of the Xbox 360. If that isn't bad enough, developers have had to decide whether to code for the lowest common denominator or provide full support for the high-end boxes, and I can't imagine too many of them are happy about it.

To add insult to injury, both companies are now working on even fancier versions of their machines; the new Xbox 360 Elite will have a bigger hard drive, HDMI support, and a snazzy black case, while a rumored PS3 refresh will at least have a bigger hard drive. Regardless of what Microsoft and Sony say about choice, this proliferation of hardware specs is not good for consumers. It creates confusion among folks who still haven't made a purchase and punishes those who have. It's also not good for developers, and as a result of these factors, it's not good for Microsoft and Sony themselves.

Chris Trumble, Publication Editor, *CPU*

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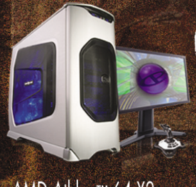

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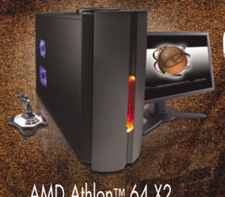

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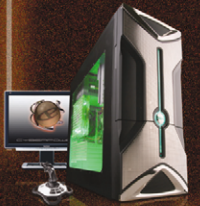

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GAMER XPLORER X7-7500

Intel® Centrino™ Duo Mobile Technology
- Intel® Core™ 2 Duo Processor
- Intel® PRO™ Wireless 3945AGB
- Intel® 945GM Chipset

Genuine Windows Vista™ Home Premium
2048 MB DDR-II PC5300 667 Memory
160GB SATA150 Hard Drive, 8x DVD+/-RW Drive
17" WSXGA TFT Display 1680x1050 pixels
1000/100/10 Network, 56K V.92 Fax/Modem
NVIDIA® Geforce® Go 7600 256 Video
4-in-1 Built-in Media Card Reader, 3x USB 2.0 Ports,
1 IEEE-1394 Firewire Port, 1 PCMCIA Type II Slot,
3 Hours Battery Life, Weight only 8 Lbs, Free Carrying Case

Intel® Core™ 2 Duo Processor
(667Mhz FSB)

T7600 4MB L2 Cache, 2.33Ghz	$ 1969
T7400 4MB L2 Cache, 2.16Ghz	$ 1739
T7200 4MB L2 Cache, 2.0Ghz	$ 1595
T5600 2MB L2 Cache, 1.83Ghz	$ 1539
T5500 2MB L2 Cache, 1.66Ghz	$ 1495

FREE SHIPPING **$1495**

GAMER XPLORER X5-6800

Intel® Centrino™ Duo Mobile Technology
- Intel® Core™ 2 Duo Processor
- Intel® PRO™ Wireless 3945AGB
- Intel® 945GM Chipset

Genuine Windows Vista™ Home Premium
1024 MB DDR-II PC5300 667 Memory
120GB SATA150 Hard Drive
15.4" WXGA TFT Display 1280x800 pixels
8x DVD+/-RW Drive
1000/100/10 Network, 56K V.92 Fax/Modem
Mobile ATI Radeon x1600 PRO 256MB Video
3-in-1 Built-in Media Card Reader, 3x USB 2.0 Ports,
1 IEEE-1394 Firewire Port, 1 PCMCIA Type II Slot,
6 Hours Battery Life, Weight only 6.39 Lbs, Free Carrying Case
6 Custom Colors to Choose From

Intel® Core™ 2 Duo Processor
(667Mhz FSB)

T7600 4MB L2 Cache, 2.33Ghz	$ 1619
T7400 4MB L2 Cache, 2.16Ghz	$ 1389
T7200 4MB L2 Cache, 2.0Ghz	$ 1245
T5600 2MB L2 Cache, 1.83Ghz	$ 1189
T5500 2MB L2 Cache, 1.66Ghz	$ 1145

FREE SHIPPING **$1145**

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TECHNICAL SUPPORT: 877.876.4965 HOUR: M-F 8:30AM - 6:00PM SAT 9:30AM - 3:00PM

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CyberPOWER Inc.

Compiled by Blaine Flamig

Vending Machine Memory

In another sign that you can get about anything you want in an airport, Kingston and N.J.-based MyMemory are offering USB flash drives and CompactFlash and SD cards via what's believed to be the world's first flash memory vending machine. The first MyMemory Digital Memory vending machine set up shop in London's Gatwick Airport's North Terminal, and additional machines are already planned for Heathrow Airport and London train stations. MyMemory is reportedly also developing relationships with SanDisk and Olympus, as well as Sennheiser and Uniross, to join the vending machine movement. According to Anne Keefe, Kingston's sales director, buyers "want instant access to SD cards and USB drives as they need them 24/7, so vending machines in public spaces was the most obvious solution." ▲

1TB Desktop Drives From Dell

Starting in mid-March, Dell and its Alienware subsidiary began giving buyers the option to configure select XPS, Aurora, and Area 51 desktops with a 1TB Hitachi Deskstar 7K1000 drive. In case you're curious, Dell says that's enough storage to keep a million photos, 16 *days* of DVD-quality video, or 1 million minutes of music. Yikes. As Neil Hand, Dell's VP of worldwide consumer marketing product group, aptly put it, "This type of capability used to be available only to the largest corporations." The 7,200rpm 7K1000 includes 32MB of cache; uses a 3Gbps SATA interface; and offers 8.5ms/9.2ms (read/write) and 4.17ms average seek and latency times, respectively. At press time, customizing a Dell or Alienware rig with the 1TB drive added $400 to the original price. ▲

Samsung Spins A 200GB 2.5-inch Drive

If we cross our fingers, maybe *The Inquirer*'s theory that Samsung could one day release enthusiast versions of the 200GB 2.5-inch drive it recently announced as part of its SpinPoint MP1 Series will come true. Until then, Samsung is developing the series with enterprise-class applications in mind for workstations, as well as RAID and blade servers. At any rate, the 7,200rpm drive owns the industry's highest max density per disk at 100GB per platter, according to Samsung. If 200GB is overkill, Samsung will also release 80/120/160GB models with 8 to 16MB cache. The MP1 uses perpendicular magnetic recording, NCQ, a rotary vibration controller, 3Gbps SATA interface, and an optional digital free-fall sensor. Expect mass production to kick in after Samsung releases samples in early May. ▲

Asus' Arctic Square Is Cool For Being Square

Packing double-sided "ladder-shaped" fins, dynamic fan-speed control, four copper heatpipes, and a blue LED, Asus' Arctic Square CPU Cooler is an intriguing, diminutive cooling option for various dual- and quad-core CPUs from Intel and AMD. Asus says the Arctic Square is capable of reducing VRM temps by 10 to 15 degrees Celsius, and with the unit's 92mm, 2,300rpm fan residing inside the heatsink, the Arctic Square measures just 5.31 x 4.17 x 4.25 inches (HxWxD). Additionally, Asus' patented retention module design makes installing the Arctic Square an easy three-step task. ▲

Hardware Mole

Best Buy Gets Its Mac On In More Stores

The odds of being able to buy a Mac in your local Best Buy got better in early April when the nation's largest tech retailer said it would increase the number of stores it sells Apple rigs in to 200 throughout the fall. Best Buy now sells Macs in nearly 60 of its more than 800 national stores. Piper Jaffray analyst Gene Munster said a small number of those 200 stores may include walled-off Apple stores within a store. Other Best Buys will have improved Apple layouts, he says. "What is clear, you won't wander around Best Buy to shop for Apple." Beyond giving Apple more exposure in Best Buy, the agreement also helps offset the closings of more than 125 CompUSA stores, in which Apple goods were sold, earlier this year. ▲

Sony Touts (Tiny) OLED TV

Braving long lines occasionally pays off. In January at CES, line-waiting put you eyeball-to-screen with an 11- and a 27-inch OLED television prototype that Sony showed audiences to overwhelmingly favorable response, due mostly to the excellent image quality (1,000,000:1 contrast ratio certainly helps) that the sets produced in frames less than an inch thick. In April, Sony said at Display 2007 Forum in Tokyo it will produce 1,000 of those sets by year's end, making it the first to bring an OLED TV to market for consumers. Rumors point to the 11-inch model (1,024 x 600 resolution) coming first. "It won't be easy for OLED TVs to replace LCD TVs, but we would like to turn OLED TVs into a big new business," said Katsumi Ihara, Sony executive deputy president, Tokyo. Elsewhere, Toshiba and Matsushita had already announced they plan to jointly release 20.8-inch OLED sets within three years. ▲

"Game On" With Mscape

If HP can deliver the goods with its mobile Mscape gaming technology, it's not inconceivable we could one day stroll through Central Park and use its real-life environments as backdrops in immersive handheld gaming. A video HP screened for reporters in early April showed young gamers doing just this in San Francisco. Essentially, sensors that game developers could spread about in real-life environments would trigger gameplay events that unlock bonuses or other surprises. With Voodoo founder Raul Sood, now head of HP's gaming division, in tow, HP's announcement hinted toward using GPS sensors, wireless connectivity, and a Wii-like motion-sensor system to motivate players to get off their duffs while playing. HP officials said the company has been tinkering with Mscape technology for two years, but officials wouldn't confirm if HP is working on its own Mscape handheld. ▲

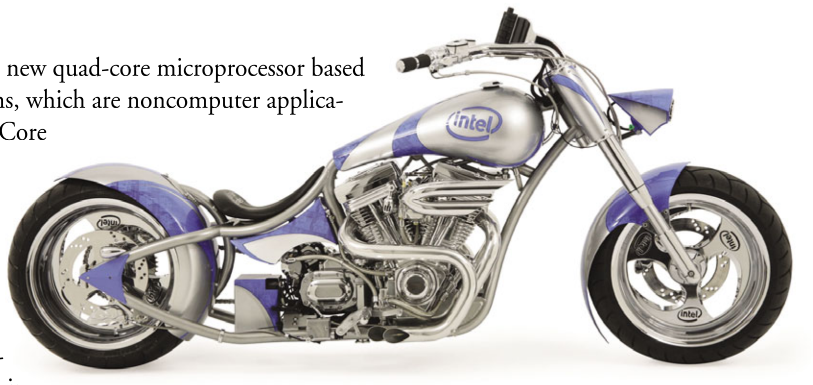
Canonball!

This being the June issue, it seems only appropriate to offer up some hardware for the dog days of summer to come. A nice place to start is JVC Japan's XA-AW33, a waterproof MP3 player that can keep you entertained in and out of the pool. In water, the XA-AW33 ripples the agua as it plays, while the player's circular, blue LED provides the player's "healing" power. The XA-AW33 only has 256MB memory and needs four AAAs for its 15 hours of rated battery life, but it bundles several jazz tunes and supports MP3, WMA, and WMA DRMed files. The XA-AW33 is available in Japan for about $170. ▲

Compiled by Dean Takahashi

Intel Launches Quad-Core Microprocessors For Embedded Market

Marking 30 years in embedded chips, Intel has announced a new quad-core microprocessor based on its Xeon server microprocessors for embedded applications, which are noncomputer applications such as industrial or control products. The new Quad-Core Intel Xeon processor 5300 series, which operates at 2GHz (E5335) or 2.33GHz (E5345) speeds, dispels the notion that embedded processors use yesterday's technology. Intel is using the quad-core chips in a new signature motorcycle from Orange County Choppers. These chips will power high-tech gadgets on the chopper, including an ultramobile PC, a fingerprint identification reader, a digital dashboard with ignition control, cameras that replace rear view mirrors, and much more. The Quad-Core Intel Xeon Processors start at $690. ▲



Nvidia's GPGPU Goes After High-Performance Computing Market

When Nvidia launched its first GPGPU (General-Purpose computation on GPUs) initiative last fall with the release of the GeForce 8800, it pledged that it would expand the market for graphics chips with more general-purpose applications that CPUs currently perform. A case in point is the high-performance supercomputing market, where massively parallel applications can benefit from the GPU's ability to crunch a huge amount of data. In the past, supercomputers used scores of CPUs for such functions, but Andy Keane, general manager of Nvidia's GPU Computing division, says that some math-intensive applications can get a 100-fold improvement if they use two GPUs for every CPU, Keane says. ▲

Watching The Chips Fall

Here is pricing information for AMD and Intel CPUs.

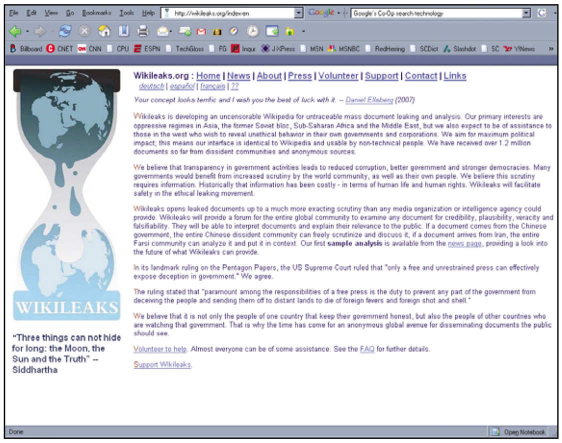
*Retail price
** Manufacturer's price per 1,000 units
Other current prices, if indicated, are lowest OEM prices available through Pricegrabber.com

CPU	Released	Original price	Last month's price	Current price
AMD Athlon 64 X2 Dual-Core 4600+ AM2 only	5/31/2005	$803**	$219	$115
AMD Athlon 64 X2 Dual-Core 4800+ energy efficient	5/16/2006	$671**	$499	$189
AMD Athlon 64 X2 Dual-Core 4800+	5/31/2005	$1,001**	$499	$189
AMD Athlon 64 X2 Dual-Core 5000+ AM2 only	5/23/2006	$696**	$235	$204
AMD Athlon 64 X2 Dual-Core 5200+ AM2 only	9/6/2006	$827**	$252	$200
AMD Athlon 64 X2 Dual-Core 5400+ AM2 only	12/12/2006	$485**	$495	$275
AMD Athlon 64 X2 Dual-Core 5600+ AM2 only	12/12/2006	$505**	$325	$299
AMD Athlon 64 X2 Dual-Core 6000+ AM2 only	2/20/2007	$464**	$449	$379
AMD Athlon 64 FX-62	5/23/2006	$1,031**	$394	$369
AMD Athlon 64 FX-70	11/30/2006	$599/pair	$299/pair	$320/pair
AMD Athlon 64 FX-72	11/30/2006	$799/pair	$405/pair	$375/pair
AMD Athlon 64 FX-74	11/30/2006	$999/pair	$515/pair	$532/pair
Intel Pentium 4 660 3.6GHz 2MB cache 800MHz FSB 90nm	2/21/2005	$605**	$325	$325
Intel Pentium 4 661 3.6GHz 2MB cache 800MHz FSB 65nm	12/27/2005	$401**	$169	$149
Intel Pentium 4 670 3.8GHz 2MB cache 800MHz FSB 90nm	5/26/2005	$849**	$641	$641
Intel Pentium D 840 3.2GHz dual-core 2MB cache 800MHz FSB 90nm	5/26/2005	$530**	$574	$574
Intel Pentium D 920 2.8GHz dual-core 2MB 800MHz FSB 65nm	12/27/2005	$241**	$129	$98
Intel Pentium D 930 3GHz dual-core 2MB 800MHz FSB 65nm	12/27/2005	$316**	$155	$124
Intel Pentium D 940 3.2GHz dual-core 2MB 800MHz FSB 65nm	12/27/2005	$423**	$218	$139
Intel Pentium D 950 3.4GHz dual-core 2MB 800MHz FSB 65nm	12/27/2005	$637**	$246	$248
Intel Pentium D 960 3.6GHz dual-core 2MB 800MHz FSB 65nm	5/1/2006	$530**	$339	$341
Intel Core 2 Duo E6300 1.86GHz 2MB cache 1,066MHz FSB 65nm	7/27/2006	$183**	$182	$180
Intel Core 2 Duo E6400 2.13GHz 2MB cache 1,066MHz FSB 65nm	7/27/2006	$224**	$221	$217
Intel Core 2 Duo E6600 2.4GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$316**	$312	$306
Intel Core 2 Duo E6700 2.66GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$530**	$510	$507
Intel Core 2 Duo X6800 2.93GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$999**	$910	$910
Intel Core 2 Quad Q6600	1/8/2007	$851**	$845	$789
Intel Core 2 Extreme QX6700	11/14/2006	$999*	$970	$899

Fujitsu Develops New 32-Bit RISC Microcontroller

Your car's electronics should one day be able to sleep, stop, and jump into action the same way that computers can. Fujitsu Microelectronics has created a new 32-bit RISC microcontroller with several features aimed at automotive and industrial applications. The MB91F467B microcontroller leverages Fujitsu's previously launched MB91460 core and focuses on energy-efficient data collection, processing, and distribution and combines that with power savings and security features. The chip is aimed at applications such as body-control, automotive gateways, and central controller systems. Also, manufacturers can connect MB91F467B to Fujitsu graphics chips to drive dashboards and advanced driver information systems. Samples will be available in the second quarter, and the chips will cost $13 in volume. ▲

Compiled by Blaine Flamig


File Edit View Go Bookmarks Tools Help
http://wikileaks.org/index-en
Google
Google's Co-Op search technology
Billboard CNET CNN CPU ESPN TechGloss FG Inqu. J-XPress MSN MSNBC RedHerring SCDict Slashdot SC YINews
WIKILEAKS
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Open Notebook

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Your concept looks terrific and I wish you the best of luck with it. -- Daniel Ellsberg (2007)

Wikileaks is developing an uncensorable Wikipedia for untraceable mass document leaking and analysis. Our primary interests are oppressive regimes in Asia, the former Soviet bloc, Sub-Saharan Africa and the Middle East, but we also expect to be of assistance to those in the west who wish to reveal unethical behavior in their own governments and corporations. We aim for maximum political impact; this means our interface is identical to Wikipedia and usable by non-technical people. We have received over 1.2 million documents so far from dissident communities and anonymous sources.

We believe that transparency in government activities leads to reduced corruption, better government and stronger democracies. Many governments would benefit from increased scrutiny by the world community, as well as their own people. We believe this scrutiny requires information. Historically that information has been costly - in terms of human life and human rights. Wikileaks will facilitate safety in the ethical leaking movement.

Wikileaks opens leaked documents up to a much more exacting scrutiny than any media organization or intelligence agency could provide. Wikileaks will provide a forum for the entire global community to examine any document for credibility, plausibility, veracity and falsifiability. They will be able to interpret documents and explain their relevance to the public. If a document comes from the Chinese government, the entire Chinese dissident community can freely scrutinize and discuss it; if a document arrives from Iran, the entire Farsi community can analyze it and put it in context. Our first **sample analysis** is available from the news page, providing a look into the future of what Wikileaks can provide.

In its landmark ruling on the Pentagon Papers, the US Supreme Court ruled that "only a free and unrestrained press can effectively expose deception in government." We agree.

The ruling stated that "paramount among the responsibilities of a free press is the duty to prevent any part of the government from deceiving the people and sending them off to distant lands to die of foreign fevers and foreign shot and shell."

We believe that it is not only the people of one country that keep their government honest, but also the people of other countries who are watching that government. That is why the time has come for an anonymous global avenue for disseminating documents the public should see.

Volunteer to help. Almost everyone can be of some assistance. See the FAQ for further details.

Support Wikileaks.

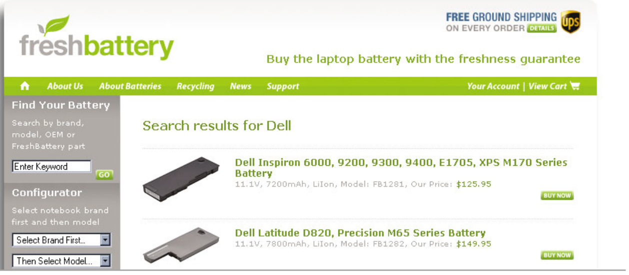
"Three things can not hide for long: the Moon, the Sun and the Truth" -- Siddhartha

Lots Of Leaks, Wiki-Style

Wikileaks.org wasn't even fully operational at press time, but we're already hooked. It's hard not to be intrigued by an "uncensorable Wikipedia for untraceable mass document leaking and analysis." The site says it uses modified versions of FreeNet, Tor, PGP, and "software of our own design" and was founded by Chinese dissidents, mathematicians, and technologists. To date, Wikileaks.org claims to have gathered 1.2 million-plus documents from dissident communities and anonymous sources. Arguably the most interesting aspect of Wikileaks.org is a notion floating about that it may be a front by the CIA or some other information-gathering organization. Add in that wikis have taken a mainstream beating recently, and Wikileaks.org has some work to do to convince the masses of its trustworthiness. ▲

Time To Recharge Your (Notebook's) Batteries

As the "battery geeks who crave power—the rechargeable kind, that is" at FreshBattery.com put it, "without the power source, your notebook is just 7 pounds of weight." To combat such a tragedy, the site supplies built-to-order laptop batteries for Acer, Dell, Apple, Gateway, HP/Compaq, IBM/Lenovo, Sony, Panasonic, and Toshiba models. FreshBattery.com says the batteries—sourced from Japanese and Canadian makers—are "never refurbished." A Configurator helps pinpoint the battery your laptop needs and its price, and FreshBattery.com stamps each battery with a born-on date and one-year warranty. It also guarantees your battery "has not been sitting on a shelf for months" because "we build them daily." Refreshing, indeed. ▲



Buy the laptop battery with the freshness guarantee

Find Your Battery

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Configurator

Select notebook brand first and then model

Search results for Dell

Dell Inspiron 6000, 9200, 9300, 9400, E1705, XPS M170 Series Battery
11.1V, 7200mAh, LiIon, Model: FB1281, Our Price: $125.95

Dell Latitude D820, Precision M65 Series Battery
11.1V, 7800mAh, LiIon, Model: FB1282, Our Price: $149.95

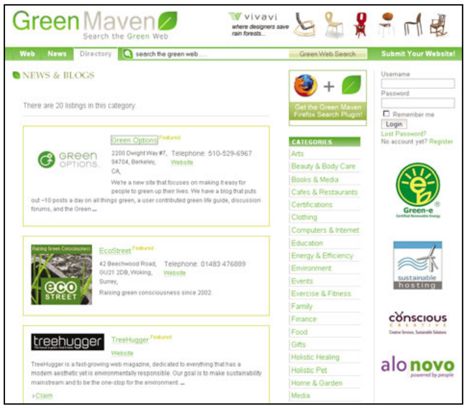
Site Seeing

Money-Making Viral Videos? How Stupid

StupidVideos.com's name tells you what to expect from the site. What it doesn't tell you is your moronic video could earn you up to $25,000 if the site's editors pick it as 2007's funniest viral video. The site also offers $5 for each submitted video that lands on its home page. In fact, money-making opportunities are everywhere at StupidVideos.com for everything from posting the most-emailed video to the funniest video as voted by other users. Heck, just opening your big, fat virtual mouth and blabbing about the site's videos can score you cash. Viral videos aren't exactly our thing, but we have to admit the Gears Of War/"A-Team" mashup is pretty, well, stupid. ▲

It's Good Being Green

If you've been searching for the "gateway to the Green Web," it's waiting at Green Maven (www.greenmaven.com). Ease up, though; we're not talking "green" as in cash money. We mean environmentally conscious Web sites, news sources, retailers, etc. Green Maven's Computers & Internet directory listings are a bit lacking to date, with just five subcategories now available, but the leads within the News & Blogs subcategory are quite interesting. The site's key feature, however, is its all-green search engine, which is based on Google's Co-op search technology and contains thousands of hand-picked, green-loving Web sites. Additionally, a Firefox plug-in lets you take the engine with you, and talk about putting your money where your mouth is: Green Maven even uses renewable energy to power the site. ▲



There are 20 listings in this category.

Green Options
2200 Dwight Way #7, 94704, Berkeley, CA, Telephone: 510-529-6967
We're a new site that focuses on making it easy for people to green up their lives. We have a blog that puts out ~10 posts a day on all things green, a user contributed green life guide, discussion forums, and the Green ...

EcoStreet
42 Beechwood Road, GU21 2DB, Woking, Surrey, Telephone: 01483 476889
Raising green consciousness since 2002.

TreeHugger
TreeHugger is a fast-growing web magazine, dedicated to everything that has a modern aesthetic yet is environmentally responsible. Our goal is to make sustainability mainstream and to be the one-stop for the environment ...

Compiled by Blaine Flamig

Subject
Camping trip to Yosemite
Grocery list
Stuff to do this week
World History notes
Notes from WWDC 2006
History of American Film -- CTCS 391

Camping Trip

Yosemite National Park (8/26 -

8/7/06 Book campsite
Climb Half Dome, need full day
Glacier Point, drive or hike?
Yosemite Falls, two-hour walk
Vernal Falls, great half-day hike

Things to bring
Food (Kurt): bread, PB&J, trail
Drinks (Nina): water, Gatorade,
Tents (Me)
Charcoal (Nancy)

To: Sarah
Cc:
Subject: Backpacking in Mexico

Fun in the sun

Hi everyone. I'm back from Mexico and can't
with you. We took a few road trips in our retro
villages, and saw ancient mountaintop pyramid
know I love spicy food but until now I didn't re
chilies out there. The best part of the trip was j
even tried surfing!

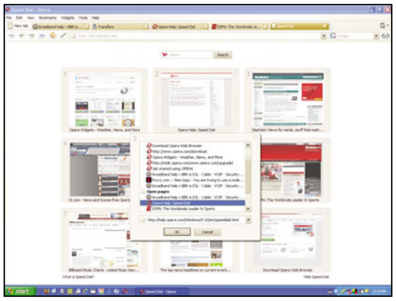
Message Size: 22.0 KB

Vista Enters The Boot Camp

With update 1.2 to Boot Camp, Apple's popular OS-swapping beta now supports 32-bit versions of Vista. An end to Boot Camp's beta existence is in sight, however, as licenses are to end in September or whenever Apple releases Leopard (Mac OS X 10.5), the successor to Tiger. It's expected that Apple will roll Boot Camp into Leopard, which will now ship in October after Apple pushed its launch data back in mid-April to concentrate on getting the iPhone out its doors on time. If analysts are correct, expect Boot Camp to be available as a standalone product in the future, with some estimates putting its price in the neighborhood of $30. Apple did state that a Windows installation of Boot Camp will still work after the beta license expires, but Boot Camp Assistant won't, and Apple won't provide driver updates to beta users after the license expires. ▲

Speed Dialing With Opera

Opera says its new Speed Dial utility, part of Opera's upgraded 9.2 version for Windows, Mac, and Linux platforms, is the "fastest and easiest way to access your favorite sites." It's definitely one of the visually coolest. Opening a new tab in Opera displays nine 3- x 3-inch thumbnails. Click a thumbnail and Opera displays a list of URLs of frequently visited sites (you can also enter your own addresses). Click a URL and a thumbnail of the site's home page appears. Clicking a thumbnail opens the site in a separate window. You can also configure them to reload anywhere from every five seconds to each half hour. A darn fine browser just got better. ▲



Searching The Mac, Google-Style

Google recorded another first in early April with its release of Desktop for Mac. Still in beta, the tool coexists with Apple's Spotlight and related plug-ins. Google software engineer Mike Pinkerton writes on Google's Mac Blog that, "we know that simply 'porting' to the Mac is not a good idea. So we took the time to develop a product that deeply integrates into Mac OS X and maintains its high standards of usability." Gadget integration will come later, Google says, but Desktop for Mac can search Web history and Gmail. Search results display in a page that's similar to a Google Web search page. According to Pinkerton, however, the tool is "a Mac product through and through." ▲

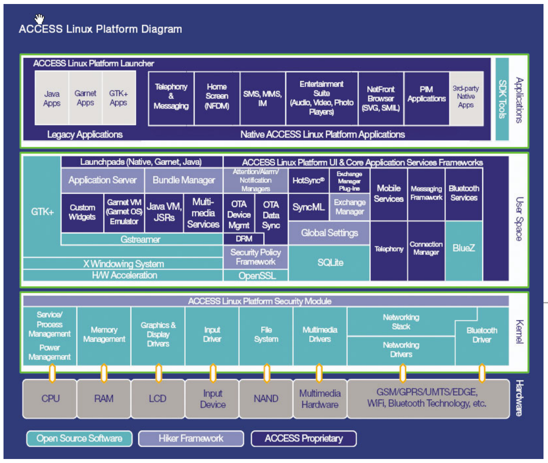
Software Shorts

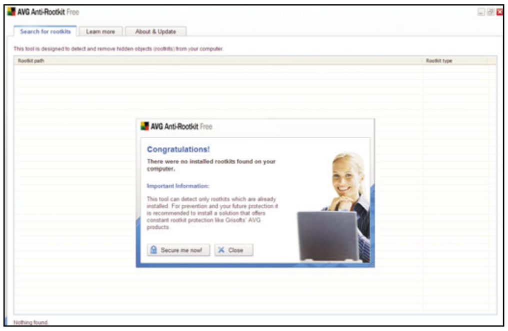
Are Second Life-Based Casinos Legal?

Linden Lab recently opened the virtual doors of casinos operating in Second Life to FBI agents as part of an investigation into the suspected gambling of Linden dollars. According to Ginsu Yoon, Linden Lab's general counsel and VP of business affairs, Linden knows of at least one agent who took the company up on the invite. The FBI had yet to comment at press time. Linden, which prohibits illegal Second Life activities, extended the invitation in an attempt to clear up rules and regulations concerning gambling in virtual worlds. Most attorneys reportedly agree that wagering with Linden dollars, which users can exchange for U.S. currency, probably does violate U.S. antigambling laws. Now, are you going to raise, check, or fold? ▲

Linux-Based Treos Coming Soon?

Although Palm officials sidestepped questions concerning rumors of a possible company buyout during a recent meeting with analysts in New York, they did announce details of a new Linux-based platform planned for future smartphones, which we may see yet this year. Palm's work on a Linux-based mobile platform isn't exactly new news, as development has been ongoing for years, although Palm CEO Ed Colligan did state that the move not only gives Palm control once again over its own OS (to go along with the Windows Mobile and Garnet platforms it's now using), it helps to create a "new foundation for Palm." Last year, Palm spent $44 million to buy a permanent Garnet license from Access, which already offers a Linux-based platform. A Palm statement says its Linux platform "is not related to the Access Linux platform." ▲





This tool is designed to detect and remove hidden objects (rootkits) from your computer.

Congratulations!

There were no installed rootkits found on your computer.

Important Information:

This tool can detect only rootkits which are already installed. For prevention and your future protection it is recommended to install a solution that offers constant rootkit protection like Grisofts' AVG products.

Nothing found.

Rootkits Be Gone

After six months of beta testing, Grisoft, the makers of the popular paid and free versions of AVG Anti-Virus, has added the free Anti-Rootkit utility to its stable of security applications. Larry Bridwell, Grisoft Global Security strategist, said at release, "AVG Anti-Rootkit is developed to detect and destroy rootkits effectively, without bothering users with false alarms." According to the company, Anti-Rootkit uses an "advanced cleaning driver" and is "absolutely not" for use with OEM bundles, software, hardware, services, or otherwise. Free Anti-Rootkit updates are included with the installation, but product support for the software isn't available at this time. ▲

BIOS Upgrades Available Online

Compiled by Steve Smith

Before you send another motherboard to the landfill, consider upgrading the BIOS and giving your PC a new lease on life. Here are a few recently released upgrades. Readers can check out www.cpumag.com/cpujun07/bios to see our entire upgrade list.

Motherboard	Date Available	URL
ASRock 775i945GZ	3/23/2007	ftp://download.asrock.com/bios/775/775i945GZ(1.80).zip
Asus A8Je	4/6/2007	dlsvr01.asus.com/pub/ASUS/nb/A8Jp/A8Jpe209AS.zip
Asus P5L-MX/IPAT	3/26/2007	dlsvr01.asus.com/pub/ASUS/mb/Utility/PC_Probe2/ProbeII10412.zip
ECS 915GV-M2	3/21/2007	www.ecs.com.tw/ECSWebSite/Downloads/DownloadFile.aspx?catid=1&driverid=3795&areaid=2&LanID=9
Gigabyte GA-M61P-S3	3/22/2007	america.giga-byte.com/FileList/BIOS/motherboard_bios_ga-m61p-s3_f3.exe
Shuttle SK22G2 V1/V2	3/8/2007	ftp://ftp.shuttle.com/BIOS/sk22g2/sk22s20n.bin
Tyan Toledo i3000R	3/28/2007	www.tyan.com/support_download_bios.aspx?model=S.S5191

The Job Search

The ESRB (Electronic Software Ratings Board) is looking for parents who want to play and rate computer and video games full time. The ESRB is the group responsible for tagging games with age-appropriate labels (E for Everyone, T for Teen, etc.). But following recent controversies surrounding objectionable content that seemed to slip past the ESRB's game rating system, the group is changing its former policy of using part-timers to scrutinize titles. President Patricia Vance explains, "Having full-time raters will allow for each one to have greater experience actually reviewing content and recommending ratings, given the increased amount of time each one would spend doing it." To wit, the ESRB wants video and computer game content raters who have experience with children and strong writing skills. Of course, familiarity with games will help, and all the better if you actually are a parent. The ESRB is hoping it will be able to test games later in the production process, including final releases, to ensure that raters are seeing the same content consumers will ultimately buy. Of course, this could be a tall order to fill—how many soccer moms out there are able to shred through the upper levels of Resistance: Fall Of Man? Maybe the kind of mom we all wished for.

35%

Percentage of cell phone users willing to accept incentive-based ads (coupons, discounts, etc.) on their phones

Harris Interactive

50%

INCREASE IN NUMBER OF IDENTITY THEFT VICTIMS IN THE UNITED STATES SINCE 2003

GARTNER

5%

Percentage of broadband users who access the Web on their Internet-enabled mobile devices

Media-Screen

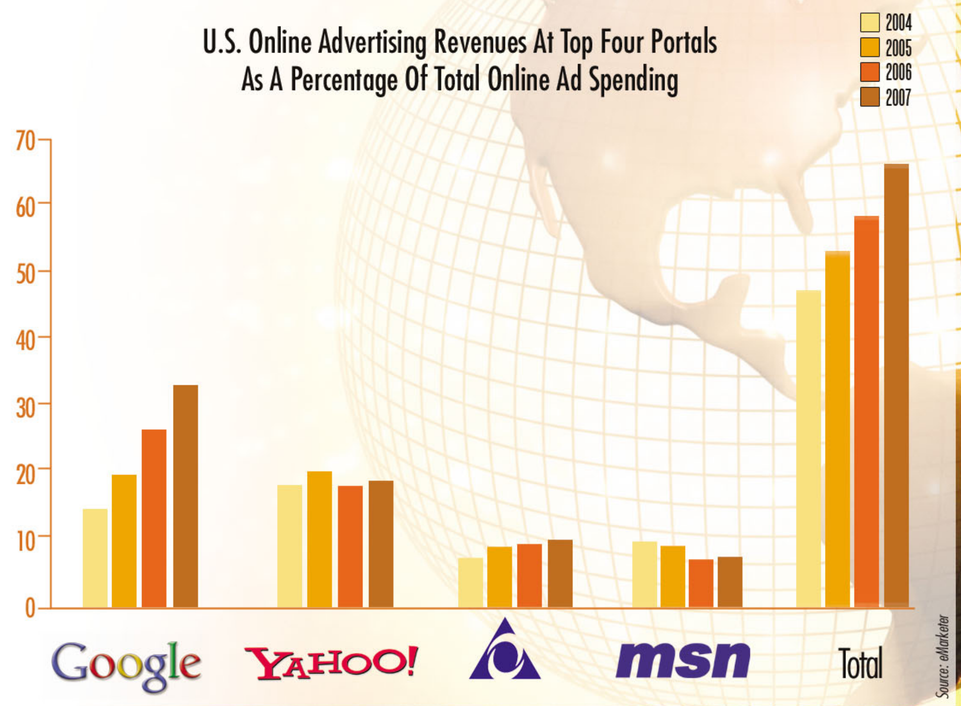
65 million

Number of .com and .net domains by the end of 2006

VeriSign

Digital Media's Short Tail?

We thought that a digital economy was supposed to help decentralize business and allow smaller players a larger platform to sell goods. When it comes to online advertising, however, conglomeration is the rule. Fully 66.6% of all ad spending will go to the top four online portals this year, according to eMarketer. Google alone will account for nearly a third of ad revenues.


U.S. Online Advertising Revenues At Top Four Portals As A Percentage Of Total Online Ad Spending

Source: eMarketer

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The New World Of Downloadable Gaming

by Alex St. John

I've been publishing downloadable games for several years now, and the business is wildly different from the traditional game space. In the console game business, the consumer pretty much has to buy a game sight unseen based on word of mouth, magazine reviews, or the expensive movie license a game was based on. And because 90% of people who buy a console game don't finish it, most of that expensive content is wasted. In the online publishing business, the content has to stand *entirely* on its own gameplay merit because 100% of the people who buy a game online decide whether to purchase it based on actually playing the game. This creates a really interesting difference between boxed and downloadable game design because the goal in boxed game design is to get a user to buy before trying, while the goal in downloadable game design is to create a game with really addictive play.

Another important difference is that boxed games need to have an "end." Games have to end, just as light bulbs have to burn out, or there is no reason for the consumer to go buy more! Online games can make money from advertising, subscription, microtransactions, etc. If you have a play mechanic that is popular in an online game, having the game end is a disaster because the game's value is proportional to its active playing audience, not to how many boxes it has sold. In the downloadable game publishing business, we generate 50% of our revenue from the 98% of the audience who plays the game trials for free supported by advertising and the other 50% from the 2% of the audience that purchases or subscribes to the games.

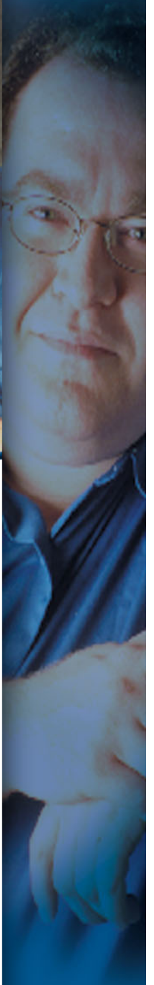
Online, we don't have to make a giant game in which most of the content is wasted art that most users never see. We focus on addictive play mechanics that have very high replay value and relatively low investment in giant bodies of content. Community and replay value trump graphics and hype in online published games, just as television shows rely on actually being great to make their money, not on the "promise" of being great that movies and console games rely on.

There are some goofy people out there who say that in-game advertising is the next big thing in console games. Turning games people pay for into overt adware is not a bright idea; it ruins the game *and* annoys the customer. *Free* content broken into 45-minute episodes, distributed over many seasons, and supported by dozens of advertisers is the way television solved that business problem, and the same will ultimately be true for games. The truth that some deluded publishers don't want to hear is that advertising is not a significant opportunity for giant, mostly single-player, boxed console games.

Although most downloadable games developed today don't have the depth and production values that high-end console games have, they are increasingly advanced in community and replay features not found in games designed for offline play. Budgets for downloadable games are on the order of $150,000 to $300,000, not $15 million to $30 million, but the games are profitable before they ever leave the studio because an advertiser will sponsor the free trial of a promising new downloadable game before it's even finished. As advertiser support of downloadable gaming grows, the budgets, production values, and volume of free, sponsored play is also increasing.

Another misconception among traditional game publishers is that "episodic" versions of the same giant, linear games they make today will be a great way to publish them online. This idea again derives from a misunderstanding of the unique nature of interactivity as a media. World Of Warcraft is a great "episodic" game not because Blizzard needs to release new content every month to keep the game fresh, but because the community of players recycles the art and game mechanics to produce an infinite profusion of game experiences. The next great online distributed games won't be chopped-up versions of traditional console-style games; they will be games that are increasingly authored by the community of people who play them. ▲

Alex St. John was one of the founding creators of Microsoft's DirectX technology. He is the subject of the book "Renegades Of The Empire" about the creation of DirectX and Chromeffects, an early effort by Microsoft to create a multimedia browser. Today Alex is president and CEO of WildTangent Inc., a technology company devoted to delivering CD-ROM quality entertainment content over the Web.



> There are some goofy people out there who say that in-game advertising is the next big thing in console games.

Send your feedback to thesaint@cpumag.com

DREAM HARDWARE

These Gizmos Don't Sing It, They Bring It

Wicked, tricksy, false. Someone's puckishly messing around with us. We have the world's biggest TV, but not really. We have even bigger HD, but from a device that doesn't even *pretend* to be a TV. Perhaps it's all down to the Deceiver himself, El Diablo?

---

by Marty Sems

Peak Consult El Diablo

Something smells sweet in Middelfart, Denmark. El Diablo can make even fire and brimstone smell like roses. This is the most hellacious loudspeaker from Danish company Peak Consult (www.peak-consult.dk). It's crafted by hand, and it's shipped with its own wax so the lucky owner can keep up the hand-rubbed finish on its Italian walnut. "Every component has been chosen for its sonic and musical behaviour, with no consideration for cost," Peak Consult says. But shouldn't one count the cost in any bargain with El Diablo? (Faust, I'm talking to you.) This demon king sells for $64,999 per pair from U.S. distributor Signals SuperFi (www.signals-superfi.com).

Photo from scr3.golem.de

Tecnovision Luxio

Making the recent 108-inch Sharp look positively puny is what a manufacturer claims is the new "world's biggest TV." However, astute observers have pointed out that it's really a small example of outdoor LED display technology, like a JumboTron, not an actual LCD or plasma HDTV. The Luxio isn't from Japan, nor Taiwan, nor even Korea. Try Italy. Tecnovision (www.tecnovision.it) says that it measures 205 inches corner to corner. The Luxio is HD-ready, the company says, and its 1,342 x 756 resolution would certainly have the pixels for 720i/p. Regardless of whether this $465,000 hawg is a "real" TV, it certainly acts like one.

Panasonic PT-DW10000U

If your budget for home entertainment is bigger than most folks' mortgages, you're not going to let some electronics company dictate how big your TV will be. You'll not be limited to 103, 108, or even 205 inches—in fact, you'll only grudgingly limit your screen to the size of your wall. Sign your name on the slip, and $74,999 later, you'll take possession of this hearty 1080p projector from Panasonic (www.panasonic.com). The three-chip DLP PT-DW10000U belts out 10,000 lumens thanks to its four lamps, and it even maintains a 5,000:1 contrast ratio under the right conditions. If you can't live without "larger than life" in your home theater, start shopping here. ▲

Your Next Data Vault

Hard Drives For Desktops & More

Your choice is still pretty straightforward when you're buying a hard drive for your desktop PC. If you're a performance crank, buy a 10,000rpm Western Digital Raptor. If you'd rather have a lot more capacity for your money, buy one of the latest crop of 7,200rpm drives. For data redundancy, faster throughput, or a little of both, buy a matching set of drives and RAID them.

Capacity pretty much sells itself. You know better than anyone how much space your music, pics, games, and bloatware take up, not to mention the video streaming in through your DVR app. Fortunately, today's drives are bigger than ever. Terabyte models are finally here, and 750GB and 500GB drives are gradually falling in price.

Another big consideration is performance. A faster drive can speed up malware scans, backups, game level loads, and installations of apps from EXEs downloaded to the hard drive. Media encoding can also benefit from good disk throughput.

There are few remaining manufacturers of desktop drives, but I was able to get samples from all four. Hybrid hard drives from the likes of Samsung or Seagate must wait for a more dedicated examination. Using 128MB or 256MB of fast, nonvolatile NAND memory as a monster cache buffer and working in conjunction with an OS such as Windows Vista, a hybrid drive can speed up boot times and random accesses while simultaneously allowing spin-down of the hard disks to conserve power.

As noted in the "Server Drives" sidebar, I also covered a couple of 15,000rpm SAS drives, not because they necessarily fit into this review but because they had shown up independently. Of course, they're primarily of interest to server owners, but they also appeal to that wild sliver of the enthusiast pie chart with money to spend on a PCI-E SAS controller card.

How I Tested

I ran all drives inside a closed Lian-Li case directly behind front cooling fans. The test platform had a 2.66GHz Intel

Desktop Drives

*Not available for RAID 0. **To and from Cheetah 15K.

Scores in brackets are from RAID 0 arrays, as available. HD Tach RW, Nvidia controller, and Iometer tests were applied to unformatted drives. PCMark05 and the folder transfer tests were performed with formatted NTFS partitions. All tests were done with write caching and NCQ enabled.

	Hitachi Deskstar 7K1000 1TB	Samsung HD501 LJ 500GB	Seagate 7200.10 750GB	Western Digital Caviar SE16 500GB	Western Digital Raptor 150GB
Interface	SATA 3Gbps	SATA 3Gbps	SATA 3Gbps	SATA 3Gbps	SATA 1.5Gbps
Spindle speed (rpm)	7,200	7,200	7,200	7,200	10,000
Cache (MB)	32	16	16	16	16
Average seek time, as advertised (ms)	8.5 read/9.2 write	8.9 read	8.5 read/10 write	8.9 read	4.6 read/5.2 write
Shock tolerance, op/non-op (G, 2ms)	70/300 (1ms)	63/300 (1ms)	68/300	65/250	65/250
Warranty (years)	3	3	5	1 (retail)/3 (bulk)	5
HD Tach RW					
Read rates, avg/max (MBps)	72.7/102	68.4/87	67.5/85 [116.5/153]	66.8/84 [123.6/159]	78.0/89 [132.3/169]
Write rates, avg/max (MBps)	72.6/88	67/85	66.2/85 [104/133]	66.7/84 [113.8/140]	79.3/99 [121.6/159]
Random access (ms)	13.4	16.1	13.6 [16.1]	13.8 [13.7]	8.0 [8.4]
Burst rate (MBps)	160.5	184.9	119.9 [183.8]	167.8 [206]	125.3 [189.2]
CPU utilization (%, +/- 2%)	3	0	4 [4]	2 [7]	2 [4]
Nvidia Speed Test*					
Burst read (MBps)	124.4	126.4	86.6	105.6	110.5
Sustained read (MBps)	85.3	85.7	79.8	73.2	88.2
Iometer					
File server (IOps)	95.2	89.30	100.88 [96.91]	126.07 [125.97]	176.21 [200.01]
Web server (IOps)	120.4	108.15	109.84 [98.42]	134.04 [118.57]	196.49 [194.67]
PCMark05					
Overall score (points)	6879	5661	5097 [6008]	5867 [6971]	7559 [8333]
XP startup (MBps)	10.4	8.6	8.4 [10.9]	10.4 [12.2]	10.9 [15.3]
Application loading (MBps)	8.8	6.9	6.5 [7.5]	7.5 [8.8]	11.6 [11.1]
General usage (MBps)	7.8	5.9	5.3 [7.1]	6.8 [8.9]	9.8 [11.5]
Virus scan (MBps)	110.5	82.1	80.3 [80.1]	88.1 [74.4]	93.4 [86.4]
File write (MBps)	80.1	82.8	61.2 [69.5]	61 [95.4]	87.8 [98.5]
Folder Transfers (minutes:seconds)					
4GB read to host	2:36	2:40	2:47 [2:33]	3:00 [2:40]	2:57 [2:57]**
4GB write from host	5:18	5:00	8:44 [3:03]	5:43 [2:35]	2:57 [2:33]**
Price	$399	$189	$349.99	$199.99	$249.99
CPU rating	●●●●	●●●	●●●	●●●◖	●●●●◖

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

Deskstar 7K1000 1TB
$399
Hitachi GST
www.hitachigst.com
●●●●

Barracuda 7200.10 750GB SATA
$349.99
Seagate
www.seagate.com
●●●

HD501LJ 500GB
$189
Samsung
www.samsung.com
●●●

QX6700 quad-core processor and an Evga motherboard with an Nvidia nForce 680i SLI chipset. There were 2GB (2x 1GB) of Corsair CM2X1024-8500C5D Dominator DDR2 sticks running at 1,066MHz, a GeForce 7900 GTX 512MB graphics card, and a Corsair HX620W power supply. The OS was a 32-bit Windows Vista Home Premium Edition, which I installed on a RAID 0 composed of two 160GB Maxtor 6Y160M0 drives running on the nForce's SATA RAID controller with version 15.00 drivers.

My tests mostly involved synthetic benchmarks mixed with some real-world, hand-timed file transfers. First up was HD Tach RW 3.0.1.0 and its Long Bench (8MB clusters) test, which is more granular than the Quick Bench yet seems to show less of a performance delta between a drive's read and write rates. I'll have to re-examine this choice in future reviews. HD Tach also revealed each unformatted drive's random access time, burst rate (indicating cache hits), and approximate CPU overhead. Nvidia's nForce controller Speed Test yielded some similar information, but it's too unrepeatable to take seriously.

Next was Iometer 2004.07.30 with custom File Server and Web Server tests, also run on a bare, unpartitioned drive. Iometer tests a drive's ability to queue and process concurrent requests from multiple simulated sources. I set up the File Server test with one virtual user and 16 outstanding IOs and the Web Server trial with four users and 64 total outstanding IOs.

For the PCMark05 1.2.0 and timed folder transfers, I initialized and formatted each drive as one NTFS partition with an 8KB cluster size. Futuremark's PCMark05 synthesizes common tasks, such as loading apps or doing a virus scan, and reports on a drive's probable skill at each.

In the real-world transfer tests, I timed how long it took each drive to save a 4GB test folder of mixed file types from a host array (writing) and then, after a reboot, how long it took to copy the folder back to the host. A caveat of any transfer test is that the speed of the host drive or array, bus congestion, and other issues become factors. To try to make the host array faster at sequential transfers than the drive or array being tested, I used two WD1500ADFD Raptors in a RAID 0 on the nForce controller. This arrangement minimized bottlenecking for the most part. I turned to the single Seagate Cheetah 15K.5 when it was the Raptors' turn for testing.

Seagate and Western Digital both sent two examples of their evaluation drives for RAID 0 tests. I built each array using Nvidia MediaShield's default 64KB stripe size on a dedicated channel of the Nforce controller. The RAID 0 scores, where available, are listed in brackets ([ ]) in the chart.

Keep in mind that you shouldn't put too much stock in the performance scores in my chart. Manufacturers want to show off their latest and greatest products, and not all of them had pushed beyond 750GB or even 500GB at this writing. Thus, my purported "head-to-head" turned out to be more of a scattershot roundup comprising a mix of capacities, spindle speeds, intended purposes, and even form factors. Also note that a smaller capacity in any drive family may exhibit speed, acoustic, cache size, and shock tolerance differences from the top model(s).

Hitachi Deskstar 7K1000 1TB

Coming in literally hours before press time is the first terabyte drive I've seen. Sure, it's an arbitrary milestone, but it's still a very cool achievement.

Packing a 32MB buffer—double the cache of any competitor thus far—this 7,200rpm, 3Gbps SATA brute fits roughly 1,000GB on five PMR platters. Model HDS721010KLA330's actual capacity per Vista's Disk Management shows up as 931.51GB. Me-owww.

Performance was surprisingly good for such a big drive. (A second run of HD Tach using the Quick Bench setting revealed wildly higher, and suspect, write rates.) Hitachi's TFC (thermal fly-height control) reduces read/write head errors, and three idle modes affect power draw.

Even acoustics look good at 29dB idle and 30-32dB seeking. Impressive.

Samsung HD501LJ 500GB

You can get up to half a terabyte from this SpinPoint T Series hard drive with NCQ and a density of 167GB per platter. The HD501LJ also features staggered spin-up support which, when paired with a compatible drive controller (typically found more in server products), directs each supportive SATA drive to start spinning its disks at a slightly different time. This lessens the initial draw on the power supply, but it only really matters in systems with several drives.

The HD501LJ acquitted itself very well in timed folder transfers and PCMark05, although its Iometer scores seem to indicate that it's happiest with single-user system duty. Its three-year warranty falls short of Seagate's enviable five-year coverage period but looks much more enticing than Western Digital's stingy one-year retail guarantee. To those with sour memories of Samsung hard drives made half a decade ago or earlier, I can only say that my evaluation models have been as reliable as any other brand's since the Korean

Server Drives

Server drives trump desktop units with 10,000rpm and even 15,000rpm rotational speeds, among other things. (Hitachi used to sell 12,000rpm drives, too.) Such high spindle speeds and platters that are typically smaller in diameter mean that the read/write heads don't have to wait as long or move as much to find data as the disks spin around, making sub-8ms access times possible. Smaller platters limit capacity but also reduce vibration, power consumption, and heat generation.

These drives use interfaces more suited to servers' needs, such as SAS (Serial Attached SCSI) or FC and FC-AL (Fibre Channel-Arbitrated Loop). SAS is the evolution of SCSI from a chain of devices on a broad ribbon to a point-to-point topology with thin cabling. A SAS controller is backward-compatible with SATA drives, although you might need an adapter cable. An SAS drive's data and power connectors may be fused together into a unified connector with locator pins. Because of this compatibility, admins can mix specialized SAS units with less expensive SATA drives for more cost-effective storage.

Meanwhile, Fibre Channel drives are optimized for networked storage on WANs spread over large distances. "There are a number of added checks and balances within FC for that environment," says Seagate's David Szabados. "With FC, these are the systems that are traveling worldwide on networks, and they have communications protocols that help . . . tell the system exactly where the information came from, what ID it is, etc."

Server drives used to require special motherboards with enough bandwidth for PCI-X controller cards, but now PCI-E has brought high throughput potential to even mainstream users. PCI-E controller cards are already popping up for SAS and other server interfaces, making it finally feasible for enthusiasts to seriously consider going 15K.

LSI Logic graciously loaned me a bulk-wrapped, 4-port SAS3041E-R controller card ($211 online) for PCI-E. LSI's site didn't list a driver for Windows Vista, but the OS automatically installed a not-exactly-generic one for LSI's SAS 3000 series. ▮

Seagate Cheetah 15K.5 300GB

Seagate's Cheetah 15K.5 (model ST3300655SS) is one of the fastest hard drives on the planet. It's an SAS, PMR drive with small platters and a relatively sparse areal density of 110Gbpsi.

Performance is understandably impressive with a drive like this. My Cheetah had some ups and downs in PCMark05, but more specific controller drivers might bring its scores more in line. Granted, the drive is optimized for server use, not the desktop tasks PCMark05 simulates.

Like a predatory cat, the Cheetah was extraordinarily quiet in comparison to the raucous Raptor, despite its 50% higher spindle speed. Heavy seeks during Iometer runs were barely audible over my test PC's moderate level of fan noise.

Cheetah 15K.5 300GB
$1,100 (street price)
Seagate
www.seagate.com
●●●●◖

Seagate Savvio 15K.1 73.4GB

Blade servers are the focus of Seagate's 2.5-inch Savvio line, not notebooks. Sure, it would be cool if you could wedge a fat, 0.6-inch thick 15K beast like model ST973451SS into your luggable fragmeister, but your battery life would suck and you'd need some sort of hard drive cooling. Seagate talks up the Savvio's low power consumption (5.8W at idle), but that's "low" in the server world, not the laptop realm.

It amazes me to see a 15,000rpm drive this small, not to mention 5.6ms access times. Yet for all this speed, Seagate says that the Savvio's nonrecoverable read error rate (one sector per 10E16 bits read) is the best in the world.

Savvio 15K.1 73.4GB
$425
Seagate
www.seagate.com
●●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

conglomerate completely revamped its manufacturing procedures.

Samsung reports this drive's acoustics as a whispery 27dB at idle and 29dB during seeks, numbers reminiscent of Seagate favorites of the past. And just before press time, Samsung announced new "silent and speedy" SpinPoint S166 hard drives with pin-dropping 24dB idle and 27.5dB seek ratings. The new 7,200rpm/8MB models are currently shipping in rather mild 80GB and 160GB capacities, so the news isn't all glee for HTPC do-it-yourselfers.

Seagate Barracuda 7200.10 750GB SATA

Seagate has long been *the* source for the quietest hard drives, but it appears that this time, Samsung has shown the company up. The 7200.10 specs out at 28 to 30dB while idle and 37 to 39dB seeking while in Performance mode. Fluid dynamic bearings help a little. There's also NCQ, of course.

The ST3750640AS is a 3Gbps SATA drive, but it logged oddly low burst rates. These generally mean little to overall performance but count more now that hard drives have big 16MB and 32MB caches.

The Barracuda looked good in access times and decent in Iometer and timed read tests. Write tests proved a little harder for it. The 7200.10 was actually much faster in a timed folder write from the Maxtor RAID 0 at 7:06 (minutes:seconds), but that's still significantly slower than its 7,200rpm competition. Still, a five-year warranty should mean more to most users than a small performance difference.

Speaking of Maxtor, you might be wondering where its entry is. After buying its longtime rival, Seagate twisted the knife by relegating the Maxtor name to its value line. Seagate explained that Maxtor drives are now nearly identical to current Seagates but for smaller caches and capacities.

Caviar SE16 500GB
$199.99
Western Digital
www.westerndigital.com
●●●◖

Western Digital Caviar SE16 500GB

The WD5000AAKS was, in many respects, the best overall 7,200rpm performer. It's very RAID-able, proving about 20 to 30 seconds faster in RAID 0 than its big brother, the Raptor, at least on this controller with these drivers. 28dB idle and 29 to 33dB seek ratings make this Caviar fairly quiet for a performance drive.

The SE16 loses out on the opportunity to earn another half CPU with an out-of-fashion one-year warranty on retail drives. A hard drive is nothing if it isn't reliable,

SAS drive tests used an LSI Logic SAS3041E-R PCI-Express controller card, write caching, and NCQ. HD Tach RW and Iometer tests were done on unformatted drives. PCMark05 and the folder transfer tests were performed with formatted NTFS partitions.

	Seagate Cheetah 15K.5 300GB	Seagate Savvio 15K.1 73.4GB (2.5")
Interface	SAS 3Gbps	SAS 3Gbps
Spindle speed (rpm)	15,000	15,000
Cache (MB)	16	16
Seek time, avg as advertised (ms)	3.5 read/ 4 write	2.9 read/ 3.3 read
Shock tolerance, op/non-op (G, 2ms)	60/250	40 (11ms)/ 300
Warranty (years)	5	5
HD Tach RW		
Read rates, avg/max (MBps)	113.3/133	95.5/107
Write rates, avg/max (MBps)	103.1/120	88.8/100
Random access (ms)	7.6	5.6
Burst rate (MBps)	182.2	214.6
CPU utilization (%, +/- 2%)	3	2
Iometer		
File server (IOps)	313.31	350.85
Web server (IOps)	321.49	356.7
PCMark05		
Overall score (points)	7605	6892
XP startup (MBps)	14.5	13.9
Application loading (MBps)	10.2	9.2
General usage (MBps)	9.6	8.7
Virus scan (MBps)	62.2	58.7
File write (MBps)	119.2	97.9
Folder Transfers (minutes:seconds)		
4GB read to host	2:40	2:50
4GB write from host	3:02	3:20
Price	$1,100	$425
CPU rating	●●●●◖	●●●●

A 15,000rpm Raptor?

Ever since Western Digital stunned enthusiasts by reworking a 10,000rpm SCSI server drive as a SATA performance unit for end users, rumors of a 15,000rpm successor have simmered. The rumors have boiled over recently, despite the fact that the 10K Raptor is still a niche—though popular—product without any imitators to confirm the wisdom of its bold direction. Seagate, Hitachi, and Samsung haven't fielded their own 10K or faster SATA units for end users, so the only push to improve the Raptor comes from fans and from within WD itself.

So were the CES pundits right? Is a 15K Raptor in the works? Darrin Bulik, senior marketing manager for Western Digital, said that the company wouldn't comment on unannounced products, "but you're not going to probably hear me argue if you were to continue to push that (a 15,000rpm Raptor) could be a possibility." Take that hint of a hint as you will.

What Bulik *could* say was that WD won't be abandoning the very successful Raptor, which is even going a little mainstream as some OEMs have started to offer the drive in workstations. The company has told investors that it's in the process of becoming "a more full-line supplier," Bulik says. This likely means filling in gaps in the company's lineup in enterprise and, especially, mobile segments. Obviously, if WD does return to a more full-on approach with its server lineup, the R&D effort could mean big things for future Raptors, as well. ▲

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

and part of that package, from the user's perspective, is a reasonable expectation of a replacement part should the drive have an abnormally short lifespan. Savvy buyers will go for an OEM bare drive with a three-year warranty, which matches Samsung's.

HTPC builders take note: Just before press time, WD announced a new line of AV drives with the company's PWL (pre-emptive wear leveling) feature. PWL occasionally sweeps the heads full stroke across the platters to avoid wearing some tracks on the disks more than others. WD says this problem happens more often during streaming and PVR duty than with normal usage patterns.

Western Digital Raptor 150GB

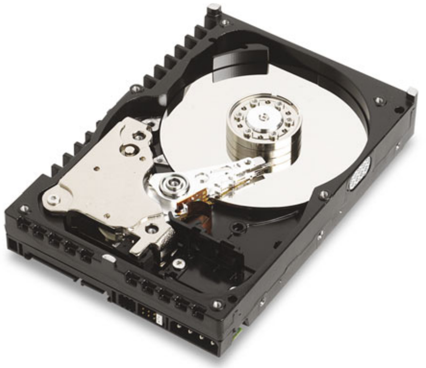
The Raptor is still the fastest SATA drive and the only 10,000rpm one. It's available in capacities up to a workable 150GB (WD1500ADFD), and it RAIDs well.

But the price is the deal-breaker for many users. I bought a 300GB, 7,200rpm Maxtor last winter for 23 cents per gigabyte. My pair of 74GB WD740ADFD Raptors cost about 10 times that amount per gigabyte, but I have zero regrets when my Raptor RAID 0 serves up game levels and big media files like nobody's business.

In HD Tach, a single Raptor consistently returned outstanding write and read rates. These mean impressively fast backups, as well as huge cumulative time savings when you're encoding video. Access times were similarly exciting (for desktop users), but as any user can attest, a Raptor's seek noise is very noticeable. You'll always know when your drives index or a malware scan begins.

The Raptor also has a 150GB "X" version with a transparent window over the head armature for $40 more.

A Mixed Bag



Raptor 150GB
$249.99
Western Digital
www.westerndigital.com
●●●●◖

You'll "feel" precious little difference between drives in the same class. Of course, one desktop drive still stands in a class of its own. The 10,000rpm Raptor wins the performance competition, although the Hitachi terabyte drive takes the spoils in the more cost-effective 7,200rpm category. The Caviar SE16 is the top choice for a 7,200rpm RAID 0; however, the Seagate and Raptor trounce its warranty. ▲

by Marty Sems

Perp Walk

Many new desktop drives and most mobile form factors now use PMR (perpendicular magnetic recording), despite the fact that the technology debuted just a year and a half ago. Put simply, PMR stands data bit regions on end in a hard disk's magnetic recording layer rather than orienting them so they lie down end-to-end, as in the old longitudinal recording paradigm. The result is much higher areal densities, which translates into greater capacities, among other things.

PMR has helped manufacturers break the terabyte barrier much sooner than they could have using LMR. "PMR allows us to continue our areal density growth of 40% a year," says Eliza Chan of Hitachi Global Storage Technologies.

Hitachi now uses PMR in its 1.8-inch and 2.5-inch drives, as well as in its new 3.5-inch Deskstar 7K1000 terabyte model, which was slated to arrive just before press time. The 7K1000 features an areal density of 148Gb per square inch, a 13% step up from the 131Gbpsi density of the Travelstar 5K160, the company's first PMR drive. "By 2010, we predict that 2.5-inch hard drives will have as much as 750GB," Chan says.

Seagate's Momentus 5400.3 notebook drive debuted in January 2006 as the industry's first PMR unit. Today, all Seagate drives use PMR technology, and spokesman Mike Hall says that the initial price premium has been largely erased.

PMR has extended hard drives' usefulness in a significant way. I'm looking forward to seeing what new developments, such as patterned media and heat-assisted recording, bring to the table.

PMR In Action

(Source: Seagate.)

Perpendicular recording has already made some capacity jumps possible, and future gains are very likely.

Desktop	**Recording method**	**Gb/square inch**	**GB/platter**
Barracuda 7200.9 500GB	longitudinal	110	160
Barracuda 7200.10 750GB	perpendicular	136	188
Barracuda 7200.11 1TB	perpendicular	164	250
Notebook	**Recording method**	**Gb/square inch**	**GB/platter**
Momentus 5400.2 120GB	longitudinal	90	60
Momentus 5400.3 160GB	perpendicular	132	80
Momentus 7200.1 100GB	longitudinal	73	50
Momentus 7200.2 160GB	perpendicular	132	80

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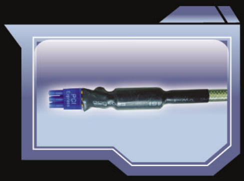
Automatic Graphic Card Power Switch+12V rail auto combine to give more power.



Patented EMI filter eliminate ripple noise and provide stable current.

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1200W

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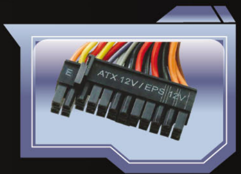
Fit in to regular ATX cases



20+4 sliding ATX 12V connector to work on Intel AMD boards. EPS 12V support.

US patent no.:US6,935,902 B1

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High-Speed DDR2 Deathmatch

1,066MHz & Beyond!

We've evaluated a number of excellent DDR2 memory kits over the past year and have rated some of them very highly. But it seems that during these last few months, memory manufacturers have really hit their stride and churned out some truly stellar products that run at ultra-high frequencies. It wasn't too long ago that DDR2-800 RAM was cutting-edge. Now, DDR2-800 is commonplace, and the upper echelon of the market is filled with high-capacity memory kits capable of clock speeds well over 1GHz.

To see how some of today's fastest DDR2 system memory performs, I pulled together a quartet of 2GB memory kits that all run at frequencies of at least 1,066MHz. The lowest-clocked kit—relatively speaking—comes by way of Mushkin. Its XP2-8500 memory is rated for operation at 1,066MHz. The highest-clocked is Corsair's current flagship, the Dominator TWIN2X2048-10000C5DF, rated for operation at 1,250MHz. Kits from Kingston and OCZ fill the gap in between at 1,200MHz and 1,100MHz, respectively.

How I Tested

I benchmarked the memory kits in this roundup on a test system running Windows XP Professional, a 2.93GHz Intel Core 2 Extreme X6800 processor, an Evga nForce 680i SLI motherboard, and a GeForce 8800 GTX. I manually configured each memory kit to run at its rating timing using the system BIOS.

To run each of the memory kits at their rated frequencies, I used a combination of CPU multiplier and FSB manipulation, with the memory and FSB running in Linked mode (4:3 ratio) through the Evga nForce 680i SLI motherboard's BIOS. I made an effort to keep the CPU running as close to its default frequency as possible. But because of each memory kit's different rating, it was impossible to keep the processor locked at a consistent clock speed and achieve maximum memory performance.

I could've used the motherboard's Unlinked memory mode to dial in the memory frequency while leaving the CPU at its default clock speed and FSB, but with a lower FSB, the memory kits would not have been able to take advantage of the extra bandwidth, resulting in virtually identical test results. By cranking up the FSB and memory speeds in lockstep, the CPU could take advantage of the additional bandwidth and increase performance accordingly.

To hit the 1,250MHz necessary for Corsair's kit, I dropped the CPU's multiplier to 7X and raised the FSB to 1,664MHz (416MHz quad-pumped). The result was a CPU clock speed of 2.92GHz. I used a similar procedure for the Kingston, OCZ, and Mushkin memory kits, but as I mentioned, there were slight differences in the CPU speed. To hit 1,200MHz with the Kingston kit, I dropped the multiplier to 7X and raised the FSB to 1,600MHz, which resulted in a 2.8GHz CPU clock. For the OCZ kit (rated at 1,100MHz), I dropped the multiplier to 8X and raised the FSB to 1,467MHz to produce a final CPU clock of 2.99GHz. For the Mushkin kit, I set the CPU multiplier to 8X and the FSB to 1,422MHz, which produced a 2.84GHz CPU clock.

Corsair Dominator TWIN2X2048-10000C5DF

Although we've already reviewed Corsair's latest flagship memory kit, the Dominator TWIN2X2048-10000C5DF, it's still the fastest matched pair of DDR2 memory modules currently on the market. As such, I felt it was worth taking another look at it and pitting it against a batch of challengers. Because of its specially designed PCB, selectively binned memory chips, and well-designed cooling hardware, Corsair's 2GB TWIN2X2048-10000C5DF kit can reliably run at a blistering clock speed of 1,250MHz with 5-5-5-18 timings at a beefy 2.4V.

Corsair was able to pull off this feat by incorporating select memory chips with its DHX (Dual-path Heat Xchange) technology. DHX is basically a system of four heatsinks that draw heat away from both the memory itself and the underlying PCB. Couple DHX with the included Dominator active memory cooler, and you have an ultra-fast memory kit that runs fast *and* cool. And I should note that the TWIN2X2048-10000C5DF kit functioned perfectly at 1,250MHz without using the Dominator active memory cooler at all.

Dominator TWIN2X2048-10000C5DF
$650
Corsair
www.corsairmicro.com
●●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

The TWIN2X2048-10000C5DF kit also supports EPP (Enhanced Performance Profiles). This makes running the memory at its rated speeds and timings a snap when you use the memory with an Nvidia nForce-based motherboard that also supports EPP.

All these features and speed come at a price, though. Corsair's TWIN2X2048-10000C5DF kit is the most expensive of the bunch by far. Not surprisingly, it also put up the best benchmark scores. Power users looking for the fastest DDR2 system memory, regardless of price, need look no further than Corsair's TWIN2X2048-10000C5DF kit. The quality and performance are undeniable, but there are certainly better values out there.

Kingston KHX9600D2K2/2G

Other than some decals on one side of their prosaic heat spreaders, there's nothing to visually differentiate Kingston's KHX9600D2K2/2G memory from any other member of its HyperX family of products. Without ripping off the heat spreaders to get a look at the actual chips and PCB, they're virtually indistinguishable from the numerous HyperX kits released in years past. Make no mistake, though: At 1,200MHz, this is the fastest DDR2 system memory to ever leave Kingston's manufacturing facility.

The KHX9600D2K2/2G kit is made up of a matched pair of double-sided 1GB DIMMs that feature Kingston's signature basic blue heat spreaders. When supplied with the right voltage (2.3 to 2.35V), these sticks are guaranteed to run at 1,200MHz with 5-5-5-15 timings. At lower clock speeds, this memory will run with tighter timings. But you're paying a premium for the high clock speeds, and that's how I recommend using the kit. Although they don't feature any elaborate cooling, the Kingston KHX9600D2K2/2G sticks were completely stable throughout my testing, even with the relatively high voltage and basic heat spreader design.

At 1,200MHz, Kingston's kit clocks in only 50MHz lower than Corsair's, but that paltry 50MHz will save you roughly $200. The $460 KHX9600D2K2/2G kit is still the second most expensive I tested; perhaps the price is fitting, considering it's also the second fastest overall.

OCZ Technology DDR2 PC2-8800 Gold Dual Channel

OCZ checked in with what turned out to be a gem of a memory kit for this roundup. Because we reviewed OCZ's Flex XLC last month (*see page 32 in the May 2007 issue*), I asked OCZ to send over its fast and affordable 2GB OCZ2G11002GK PC2-8800 Gold Edition kit.

Like the other memory kits featured here, the OCZ CZ2G11002GK kit comprises a matched pair of 1GB sticks. They're rated for operation at 1,100MHz with 5-6-6-15 timings at 2.2 to 2.4 volts. The sticks are equipped with OCZ's XTC (Xtreme Thermal Convection) heat spreaders, which feature a honeycombed design that not only increases surface area but also allows air to more easily flow over the PCB and memory chips; both aid in cooling. The heat spreaders used on today's system memory need to strike a balance between mass and surface area for the best cooling performance, and OCZ's offering seems to have done that. After running for a while, this memory was warm to the touch but never hot. And it was rock-solid stable throughout my testing.

Because of its 1,100MHz clock speed and relatively loose timings, OCZ's kit performed below Corsair's and Kingston's kits in my benchmarks, which I expected. Where this memory excelled was in terms of value. Yes, there are faster memory kits available, but they're also significantly more expensive. At about $229, OCZ's kit was the least expensive of the group by a wide margin. You could buy two of these memory kits for the price of Kingston's KHX9600D2K2/2G kit, not to mention Corsair's.

KHX9600D2K2/2G
$460
Kingston
www.kingston.com
●●●◖

DDR2 PC2-8800 Gold Dual Channel
$229
OCZ Technology
www.ocz.com
●●●●

XP2-8500 (996535)
$290
Mushkin
www.mushkin.com
●●●◖

Mushkin XP2-8500 (996535)

Of the four memory kits I tested, Mushkin's XP2-8500 memory kit offered the tightest timings but lowest frequency. The XP2-8500 kit is rated for operation at 1,066MHz with 5-5-4-12 timings at 2.2 to 2.35V.

To keep them cool, the memory sticks feature what could be considered a cross between a heat spreader and a heatsink. Mushkin calls them FrostByte heatsinks. As its name implies, a heat spreader simply pulls heat from a component and spreads it across a flat surface. A heatsink, however, features fins that increase surface area and dissipate heat into the surrounding air. Mushkin's FrostByte heatsinks are mostly flat, but they're outfitted with a loop of metal and perforations at the top that are designed to act like a heatsink and keep the memory cool. I have a tough time calling them heatsinks, but the

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concern is largely unwarranted because these sticks don't generate much heat at all, and they demonstrated no heat-related instability whatsoever.

In my testing, despite its clock speed deficit, I found the Muskin XP2-8500 kit to be a relatively strong performer. There was no way they'd be able to match the bandwidth offered by the higher-clocked Kingston or Corsair kits; the frequency deltas were just too big. But the XP2-8500's tighter timings gave them an edge over OCZ's PC2-8800 kit in a few of the benchmarks.

This kit's tighter stock timings give hardcore tweakers a bit of flexibility, as well. I set this memory for 5-5-5-15, cranked the voltage up to the top end of its recommended range, and hit clock frequencies just over 1,200MHz without much trouble. ▲

by Marco Chiappetta

DDR2 Memory Performance

In the end, the Corsair kit put up the best numbers overall, thanks to its high frequency. The Kingston kit trailed closely behind, followed by the OCZ and Mushkin kits. Something that's interesting to note is that the Mushkin kit was able to overtake OCZ's in the RightMark Memory Analyzer benchmarks despite a slight clock speed deficit. The Mushkin kit's tighter timings (5-5-4-12 vs. 5-6-6-16) offset the clock speed deficit and produced slightly higher RMMA scores. ▲

	Corsair TWIN2X2048-10000C5DF	Kingston KHX9600D2K2/2G	OCZ DDR2 PC2-8800 Gold Dual Channel	Mushkin 2GB XP2-8500
SiSoft SANDRA XI SP1				
Memory Bandwidth Benchmark Integer	8,208MBps	7,882MBps	7,467MBps	7,271MBps
Memory Bandwidth Benchmark Floating Point	8,224MBps	7,998MBps	7,504MBps	7,267MBps
Memory Latency Benchmark	69ns	66ns	65ns	69ns
Everest Ultimate Edition				
Memory Read Benchmark	10,772MBps	10,120MBps	9,875MBps	9,629MBps
Memory Write Benchmark	7,580MBps	7,275MBps	6,700MBps	6,478MBps
RightMark Memory Analyzer				
Float Copy	3,788MBps	3,773MBps	3,515MBps	3,566MBps
Float Scale	3,797MBps	3,788MBps	3,527MBps	3,579MBps
Float Add	3,724MBps	3,694MBps	3,432MBps	3,494MBps
Float Triad	3,734MBps	3,704MBps	3,446MBps	3,507MBps
Futuremark PCMark05				
Memory Performance Module	7,056	6,823	6,810	6,611
F.E.A.R				
1,024x768 (Low-Quality)	217fps	215fps	213fps	213fps
Quake 4				
1,024x768 (Low-Quality)	151.4fps	148.8fps	146.2fps	146.1fps

Specifications & Features:

Here's a quick breakdown of how the four high-speed memory kits I tested compare in regard to their specifications and features. Save for their capacities and lifetime warranties, these kits differ in every possible way. They're all rated for different frequencies and timings, require different voltages, and feature different cooling apparatuses. ▲

	Corsair TWIN2X2048-10000C5DF	Kingston KHX9600D2K2/2G	OCZ DDR2 PC2-8800 Gold Dual Channel	Mushkin 2GB XP2-8500
Total capacity	2GB (2 x 1GB)	2GB (2 x 1GB)	2GB (2 x 1GB)	2GB (2 x 1GB)
Rated frequency	1,250MHz	1,200MHz	1,100MHz	1,066MHz
Timings (CAS-TRCD-TRP-TRAS)	5-5-5-18	5-5-5-15	5-6-6-15	5-5-4-12
Required voltage	2.4V	2.3 to 2.35V	2.2 to 2.4V	2.2 to 2.35V
Cooling	DHX heatsinks	Heat spreaders	Gold-layered XTC heat spreaders	FrostByte heatsinks
Warranty	Lifetime	Lifetime	Lifetime	Lifetime
Price	$650	$460	$229	$290
CPU rating	●●●◖	●●●●	●●●◖	●●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

NVIDIA SLI READY

EPP Enhanced Performance Profiles

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HOW CORSAIR MAINTAINS
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INNOVATION

PERFORMANCE

RELIABILITY

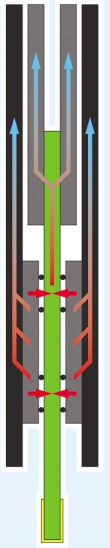
Here's the latest in Corsair's ten year heritage of innovation in performance memory: we've redefined memory heat sink technology. And the result is unprecedented performance and reliability. When we ran a preview module through system benchmarks at COMPUTEX, an overclocked DHX module with our optional airflow fan was able to hit a heart-stopping 1250MHz (PC-10,000) while maintaining cool, reliable performance.

Protect Components While You Push Performance

Pushing performance specs generates heat, and that can compromise reliability and component life. The advanced cooling ability of DHX heat sinks keeps your memory safe and reliable even as you push it to the limit. Under the name XMS2 Dominator, this DHX technology will be showing up on both Corsair parts designed for extreme overclocking and on memory designed for performance computing and gaming.

Also Featuring Enhanced Performance Profiles (EPP)

As with all new Corsair performance memory, XMS2 Dominator modules feature EPP, the new open standard for the Serial Presence Detect (SPD) jointly developed by NVIDIA and Corsair. EPP simplifies overclocking for beginners and provides unparalleled control for experts.



AIRFLOW

An optional fan (not shown) provides even more cooling and protection.

DHX DUAL-PATH HEAT XCHANGE

Corsair's proprietary DHX technology dissipates heat two ways: it draws heat away from the module through the RAMs and provides an additional path for heat transfer within the module through the ground plane!

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Philips TripleWriter SPD7000BD

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$555 (street)
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Philips' BD (Blu-ray Disc) drive is cheap and fast. But it's a little rough around the edges; you barely get a manual, the drive can't read or write DVD-RAM discs, and you're saddled with CyberLink's disc burning and A/V creation and editing tools. (The Instant Burn packet-writing program crashed my test PC repeatedly.)

On the very big upside, it's is far cheaper ($555) and far faster than the competition. In a series of eight disc burning and writing tests using CD-R/RW, DVD±R/RW, DVD+R DL, and BD-R/RE media, the Philips easily blew by the Plextor drive in six out of 10 tests and kept pace in the other four. In some cases, the Philips drive was two to seven times faster, especially burning audio CDs and writing to BD-RE discs. The performance isn't surprising: This is the first SATA BD drive I've tested, and the speedy 3Gbps SATA interface pays off.

Installing the Philips drive can be a snap. Slide it into a bay, connect the SATA data and power cables (there are no master/slave jumpers to set), turn on your PC, and install Cyberlink's software. One gripe: Philips doesn't include a 4-pin Molex power adapter/splitter, which you may need.

CyberLink's software is adequate as bundled disc software goes, but the big problem is the packet-writing driver, which crashed my test PC and summoned the dreaded BSOD whenever I tried to write to RW or RE media. (The Sony Blu-ray drive, equipped with the same software, likewise crashes. CyberLink has not been able to reproduce the error.) Remove CyberLink's suite and install Roxio's Easy Media Creator, and the problems vanish.

Bottom line: If you have Blu-ray-capable versions of the Roxio, Nero, or Ulead and don't mind fussing with the hardware, Philips' Blu-ray drive is the ultimate storage steal. ▲

by Robert Luhn

Blu-ray drive write tests	Plextor PX-B900A		Philips SPD7000	
	Min:Sec	MBps	Min:Sec	MBps
Copy audio CD (52X)	8:52	1.32MBps	6:55	3MBps
CD-RW (4X): write 130MB, 141 files	4:48	0.45MBps	6:34*	0.48MBps
DVD-R (8X): write "Dark Blue World" burn	11:25	6.78MBps	8:48	8.8MBps
DVD-R DL (4X): write 7.71GB, 6 files	28:11	4.7MBps	30:41**	4.4MBps
DVD+RW (2X): write 3.39GB, 2081 files	21:03	2.75MBps	18:27	3.1MBps
DVD-RW (2X): write 3.39GB, 2081 files	50:38	1.1MBps	36:55	1.48MBps
BD-R (2X): write 23.2GB, 3730 files	47:42	8.73MBps	47:46	8.2MBps
BD-Re (2X): write 5.69GB, 3914 files	25:27	3.8MBps	11:00	8.5MBps

*186MB, 535 files, 5 folders **7.83GB, 6 files

Specs: Speed: 2X/2X/2X (write/rewrite/read) BD, 4X DVD+R DL, 8X DVD+RW, 6X DVD-RW, 12X DVD±R, 24X CD-RW, 32X CD-R; 8MB buffer; SATA; One-year warranty.

HP Media Vault mv2020

Movies, TV shows, music, images, and games are big files that everyone wants to use. Hard drives today can't be big enough, nor your files secure enough.

The HP Media Vault holds all your entertainment and business files and makes them available to everyone on your network. You can back up files from your hard drive and stream video or music from the Media Vault to your computer. Connect to a wireless router to have the option of wired or wireless streaming. USB ports on the back of the Media Vault let you attach up to three printers, all available to the entire network. The Media Vault can also hold a bootable version of your system files for restoring machines infected with viruses or spyware.

Setup is as easy as connecting Ethernet and power cables and loading software onto each networked computer. It took me about seven minutes to set up two computers. You can set up scheduled automatic backups of files from every computer or manually drag your important files onto the Media Vault. Add a second hard drive via the open bay and configure the two in a RAID 1 setup for redundant recording or combine them into one super-drive. (The Media Vault recognizes up to 1.2TB.) Watch a movie (one is included, and you can download an additional two free) or play music and/or games from any PC on your home network, which is a lifesaver if you blow out a hard drive. Setting up a RAID 1 only needed a few clicks with the Media Vault software.

HP has just announced the StorageWorks Media Vault Pro for small businesses. It includes 1TB of storage, supports Gigabit Ethernet, and includes an automated offsite data backup service. Both home and office Media Vaults save up to nine versions of any file—great for editing important documents.

A 300GB home box is also available for $349.99. Your files, whether thousands of MP3s or six revisions of a single business plan, are worth a lot more than that. ▲

by David Finck

HP Media Vault mv2020
$499.99
HP
www.hp.com
●●●●◖

Specs: 500GB; Max capacity: 1.2TB; Gigabit Ethernet; Ports: 3 USB 2.0; Warranty: one-year (hardware), 90 days (software)

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

Asus P5B Premium Vista Edition

Asus has released a smorgasbord of products under the P5B umbrella. In fact, at the time of this writing, there were no less than nine motherboards carrying the P5B moniker; the current flagship is the P5B Premium Vista Edition.

For the most part, the P5B Premium Vista Edition is identical to the P5B Deluxe/WiFi-AP, reviewed in the September 2006 issue of *CPU*. (See page 56.) Both of the boards are based on the same chipset (Intel's P965) and PCB; they have the same slot configuration and layout; and the performance between them is similar. In lieu of the USB Wi-Fi network controller, the P5B Premium Vista Edition comes equipped with a 512MB flash drive that is compatible with Windows Vista's ReadyBoost feature.

Asus' ScreenDUO and AI Remote accessories are also included in the package. The ScreenDUO is a small secondary display that connects via USB and gives users access to a wealth of information, such as RSS feeds, email and PC health data, such as CPU and motherboard temps. And the AI Remote offers an easy way to power up the system, launch applications, or navigate audio and video tracks in WMP.

Performance and overclocking were on par with the standard P5B Deluxe, which is to say they were quite good. With a 2.93GHz Intel Core 2 Extreme X6800 processor and 2GB of RAM, the P5B Premium Vista Edition finished a multithreaded LAME MT benchmark in 30 seconds and a Cinebench 9.5 rendering pass in only 25 seconds. It also put up 252fps in my low-resolution F.E.A.R. test (640 x 480). FSB speeds in excess of 400MHz are easily attainable. ▲

Specs: Socket LGA775; Intel P965 Express; Max memory: 8GB (DDR2-800/667/533); ADI1988B HD (8 channel) codec; Marvell 88E1116; Slots: 2 PCI-E x16, 1 PCI-E x1, 3 PCI

by Marco Chiappetta

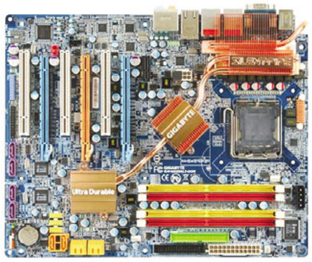
P5B Premium Vista Edition
$229
Asus
www.asus.com
●●●◖

Gigabyte GA-N680SLI-DQ6

Gigabyte may have been late to the game with its nForce 680i SLI motherboard, but the wait was worth it. This is one of the most feature rich I've ever come across and doesn't skimp in the performance or overclocking departments, either.

According to Gigabyte, the GA-N680SLI-DQ6 boasts a "6-Quad" design, which is really just PR-speak. But the features behind the marketing are nonetheless impressive. The board is optimized for quad-core processors, supports Quad SLI, and has four Gigabit Ethernet ports, a quad-triple phase power array, quad BIOS, and quad eSATA ports. Although the quad Gigabit LAN ports and effective 12-phase power array are impressive features, its layout, cooling apparatus, and performance really set the GA-N680SLI-DQ6 apart.

Despite being packed to the gills with integrated features, the GA-N680SLI-DQ6 has a surprisingly good layout. Gigabyte didn't stick with Nvidia's reference design but rather designed the board in-house. And Gigabyte did its homework, as all expansion headers and connectors are situated along the edge of the board and out of the way of major components. (The exception is the 8-pin supplemental power connector, which drops in just behind the I/O backplane.) The board's BIOS is feature-packed as well, with a wide array of options for overclockers. In fact, it maintained stability with an FSB frequency over 500MHz with only minor voltage tweaks.



An array of copper heatsinks and heatpipes located on the top and bottom sides of the board keep the chipset and VRM cool. The large heatsinks did a fine job: I experienced no heat-related instability.

Armed with a Core 2 Extreme X6800 processor and 2GB of RAM, I benchmarked the GA-N680SLI-DQ6 and found that it performed very well. It burned through a multithreaded LAME MT benchmark in only 29 seconds and a Cinebench 9.5 rendering pass in only 24 seconds. And with a pair of 8800 GTX cards installed in SLI, the board put up 68fps in F.E.A.R. at 2,560 x 1,600 with 4XAA/16XAF enabled.

The GA-N680SLI-DQ6 is fast, full of features, and very overclockable. It has a relatively high price, but you definitely get what you pay for. ▲

Specs: Socket LGA775; Nvidia nForce 680i SLI; Max memory: 8GB (DDR2-800/667/533); Audio: Realtek ALC888 HD (8 channel) codec; Networking controllers: Marvell 88E1116, Marvell 88E8052, Marvell 88E8056; Slots: 2 PCI-E x16, 1 PCI-E x1, 1 PCI-E x8, 3 PCI

by Marco Chiappetta

GA-N680SLI-DQ6
$349
Gigabyte
www.giga-byte.com
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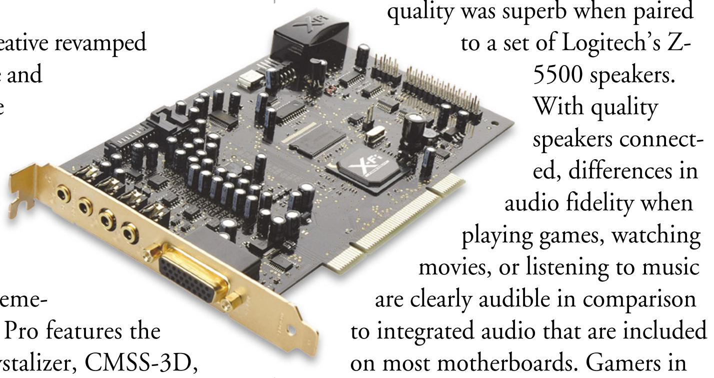
CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Creative Sound Blaster X-Fi XtremeGamer Fatal1ty Pro



The name Sound Blaster has been synonymous with PC audio since Creative Labs released its first ISA-based Sound Blaster card in 1989. Since then, the company has maintained a stranglehold on the PC audio market and shows no sign of letting up.

Creative's X-Fi sound cards are currently the undisputed kings of PC audio. They offer much better fidelity, more connectivity, and potentially higher in-game frame rates than integrated audio. They command a premium price, but since when are power users unwilling to fork over a little extra cash for superior hardware?

The problem for Creative's initial lineup of X-Fi cards was that the most desirable X-Fi for gamers from a feature standpoint, the Sound Blaster X-Fi Fatal1ty, cost upwards of $200 and included a breakoutbox that would often go unused. To remedy the situation, Creative revamped the card's bundle and released the more affordable Sound Blaster X-Fi XtremeGamer Fatal1ty Pro.

The X-Fi XtremeGamer Fatal1ty Pro features the same 24-bit Crystalizer, CMSS-3D, 3DMIDI, and EAX support as other members of the X-Fi family. It also sports all of the standard features, application software, and capabilities of the X-Fi Platinum and X-Fi XtremeMusic. The card offers a 109dB SNR (signal-to-noise ratio) and includes 64MB of onboard X-RAM, even though few apps currently take advantage of it. The only differences between it and the original X-Fi Fatal1ty are the omissions of the breakout box and remote control.

During testing, every aspect of the X-Fi XtremeGamer Fatal1ty Pro's sound quality was superb when paired to a set of Logitech's Z-5500 speakers. With quality speakers connected, differences in audio fidelity when playing games, watching movies, or listening to music are clearly audible in comparison to integrated audio that are included on most motherboards. Gamers in the market for a top-notch sound card need look no further. Non-gamers, however, may want to look into the less expensive X-Fi XtremeAudio. ▲

by Marco Chiappetta

Specs: Interface: PCI 2.1; Speaker/headphone connections: Stereo to 7.1; Flexijack (Line In/Mic In/Digital Out/Digital I/O via shared 3.5mm jack); 64MB X-RAM

Sound Blaster X-Fi XtremeGamer Fatal1ty Pro
$149.99
Creative
www.soundblaster.com
●●●

Synology DS207

At first glance, the Synology Disk Station DS207 looks much like any other personal NAS device, but dig a little deeper and you'll quickly see that this unassuming, little white box has much more going for it than basic network attached storage.

The DS207 is a barebones NAS server with two drives RAID 0/1 and Windows Active Directory Service Support. It can accommodate dual 3Gbps SATA hard drives in capacities up to 1TB (although it will only recognize a maximum 1.5TB if two drives are installed) and its integrated LAMP (Linux, Apache, MySQL, PHP) server offers functionality not available on simple NAS boxes. A 266MHz Freescale 8241 RISC processor and 64MB of RAM lie at the DS207's core; its custom OS features a built-in FTP, backup, photo, iTunes, and UPnP Multimedia servers, three USB ports, and an eSATA port.

Setting up the unit requires little more than disassembling the case, plugging in the drives, reassembling the unit, and plugging it into a network. After launching a simple application included on the bundled CD-ROM, users can log into the unit via a Web browser to configure its multitude of settings. Turning on the Web server, for example, takes nothing more than selecting the feature, clicking Enable, and copying the Web site's files to the DS207 Web directory.

I tested the DS207 with a pair of 250GB Western Digital drives installed in a RAID 1 configuration with the unit connected to Netgear Gigabit switch. It took 1:40 (minutes: seconds) to copy a 1GB file to the DS207 and 1:15 to write it back to my test PC.

Overall, the Synology DS207 is a solid product. At about $350 without drives, some users may be put off by the relatively high price, but the DS207's ease of use and extensive features merit serious consideration. ▲

by Marco Chiappetta

Specs: Form factor: 2-Bay enclosure; Network interface: Gigabit Ethernet; Drive interface: 1.5/3Gbps SATA, supports up to two 1TB HDs; RAID support: 0, 1; OS: Windows 98/2000/2003/XP, Mac OS 9 or above, Linux 2.4 or above; Dimensions: 16 x 8.8 x 21.8 cm (HxWxD)

DS207
$349
Synology
www.synology.info
●●●●

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

Shuttle®
Computers

Overclock to a Higher Level

Introducing the **Shuttle XPC SD39P2** desktop computer with all the punch over the competition. Powered by Intel® Core™2 Extreme processor and Intel® Core™2 Quad processor extraordinary energy-efficient multi-core technology, featuring PCI Express 16x and supporting up to 8GB of DDR2 memory.

Shuttle XPC shatters the myth that "bigger is better".

Shuttle XPC SD39P2

Model	Shuttle XPC SD39P2
Chipset	Intel® 975X + ICH7R
Graphics	PCI Express 16X Slot
Memory	DDR2 533/667/800
Dimensions (L x W x H)	12.79" x 8.26" x 8.66"

*Sigil Games Online recommends NVIDIA graphics processors for Vanguard: Saga of Heroes TM

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- www.shuttle.com
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Asus EN8800GTS 320MB

EN8800 GTS 320MB
$299
Asus
www.asus.com
●●●●

Nvidia's GeForce 8800 launch a few months back probably had you jonesing for a taste of the new GPU's frame rate and image quality, along with its future DirectX 10 rendering. However, you may not have been willing to sell a vital organ to get yourself in the driver's seat of its flagship roadster, the GeForce 8800 GTX. Even the 640MB GeForce 8800 GTS still costs more than $400 in some cases.

Nvidia recently released a lower-cost version of the 8800 GTS that incorporates the same specs as the original, only with half the onboard memory. The GeForce 8800 GTS 320MB has the same number of stream processors (96), the same 320-bit memory interface, and the same core and memory clock speeds as the 640MB GeForce 8800 GTS variant, only it's priced in the $299 range. I took Asus' offering out for a spin and was pleasantly surprised at its price/performance ratio.

The card comes equipped with a standard dual-slot cooler and is built on a 9-inch PCB that's identical to the Nvidia GeForce 8800 GTS reference design. Performance out of the box was simply exceptional for a graphics card in this price range. The card handily beat a legacy GeForce 7900 GTX card and even edged out a more expensive Radeon X1950 XTX in many of my tests. And in the much more palatable $299 range, the Asus EN8800GTS 320MB is hard to beat. ▲

by Dave Altavilla

Specs: GPU: GeForce 8800 GTS; Core clock: 500MHz; Memory: 320MB (1.6GHz); 320-bit memory interface; Output: dual dual-link DVI

Benchmark numbers*

	Asus EN8800 GTS 320 MB	Nvidia GeForce 7900 GTX	ATI Radeon X1950 XTX
Need for Speed: Carbon			
1,280 x 1,024	58.61	30.64	50.15
Half-Life 2: Episode 1			
1,920 x 1,200	78.31	56.18	62.74
F.E.A.R.			
1,280 x 1,024	76	66	75
Quake 4			
1,920 x 1,200	89.7	73.7	86.7
Prey			
1,600 x 1,200	72.7	56	61.6

*All games tested with 4XAA/16XAF

Autumnwave OnAir Creator

As PC TV Tuners go, there are a few well-known names in the market. These days, AMD/ATI, Hauppauge, and Diamond typically come to mind. The race for full support of emerging technologies, such as HDTV on the PC, is certainly on, and these incumbents are releasing new products with enhanced features in an effort to cash in on this growing market.

A fairly new company out of New Bloomfield, Pa., Autumnwave is retailing Korea-based OnAir Solution products in the United States. I looked at the Autumnwave OnAir Creator, one of the first products on the market to deliver HDTV from a cable connection rather being restricted to OTA (over-the-air) sources.

The product also supports NTSC cable connections, as well as OTA programming, through a single RF input. The box connects to your PC via standard USB 2.0. It also offers both SPDIF and analog 5.1-channel output through a compatible sound card. The OnAir Creator is built around LG tuner/demodulator technology and supports Windows Media Center and Nvidia's PureVideo HD decoder.

Actual tuning performance and image quality was nothing short of spectacular. I pulled in a slew of both DTV and analog cable channels over my standard cable connection. Picture quality over a 1080i output was jaw-dropping on a 30-inch widescreen LCD.

The OnAir Creator's lone flaw was its software. It would often change two channels with only a single mouse click. Scheduling a program recording was just plain clunky, and the channel guide program didn't always update properly. I also experienced odd crashes here and there when switching between DTV channels.

It seems as though OnAir needs to brush up its software utilities a bit more. But aside from that, the OnAir USB HDTV Creator has good potential, especially if you just want the ability to fire up free, cable-fed local HDTV. ▲

by Dave Altavilla

Specs: Fifth-generation LG ATSC/NTSC tuner; Inputs: RF (OTA and cable), composite, S-Video, RCA audio; USB 2.0; IR remote

OnAir Creator
Price: $249
Autumnwave
www.autumnwave.com
●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

by Anand Lal Shimpi

AMD & Intel Outline The Next Two Years

Intel launched Conroe, and AMD didn't respond. Intel mentioned Penryn, and AMD remained quiet. Just last month, Intel revealed quite a bit about its microprocessor plans for the next two years, and we've yet to hear a peep out of AMD. That will soon change, but in the interim here's what we do know.

AMD drastically cut prices across the board on its processors, making the Athlon 64 X2 quite attractive if you don't take overclocking into account. The most expensive Socket AM2 X2 will run you around $241 and can easily hang with similarly priced Intel options. I'm sure it's not great for AMD's finances, but it does give all of us a lot of choice.

In the coming months we'll learn more about AMD's microarchitecture refresh, as well as its performance. There's no word on pricing, but if AMD can keep its aggressive pricing strategy with improved performance, it may actually end up being the better buy for a period of months. Based on recent reports as to AMD's cash situation, however, it's more realistic to expect AMD to use the new architecture to help drive prices up, rather than keep them at bargain basement levels.

In a likely attempt to steal AMD's thunder before it has a chance to create a storm, Intel unveiled virtually all of the details of its Penryn microprocessor. A 45nm evolution of the current Core 2 processors, Penryn will include up to 6MB of L2 cache shared between two cores and a handful of tweaks. Intel will implement a subset of SSE4 in Penryn, which will improve performance tremendously in SSE4-optimized applications. Server versions of Penryn will support up to a 1,600MHz frontside bus, while desktop will be limited to 1,333MHz. Minor architecture tweaks include a faster divider and an improved data shuffle engine for SSE operations. Mobile versions of Penryn will support a new, deeper sleep state to help reduce power consumption while idle, as well as the ability to dynamically increase clock speed by a single bin (for example, bumping a default clock speed of 2.4GHz up to 2.66GHz) if only one core is in use.

Penryn will be socket-compatible with Conroe, but that doesn't necessarily guarantee motherboard compatibility. The real story, though, is what comes after Penryn, as a year later Intel will introduce Nehalem.

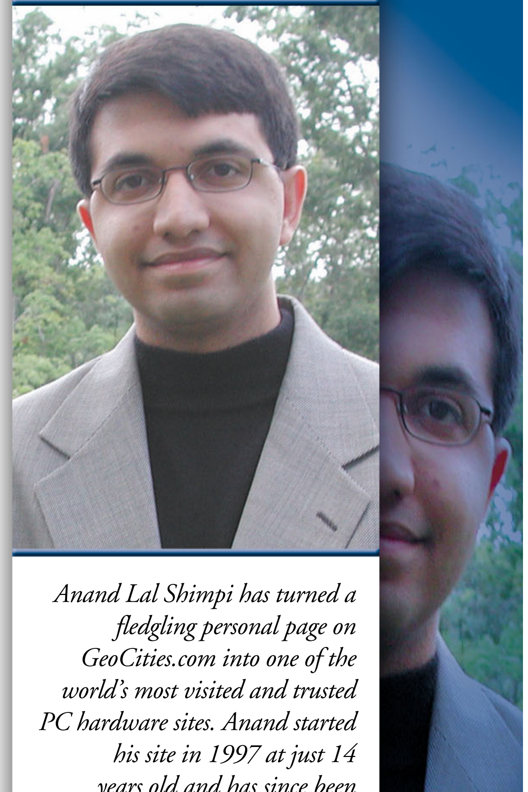
Intel has confirmed much of what we already knew about Nehalem; it will be a new socket and will be largely based around the same four-issue architecture as Conroe and Penryn, but it will ditch the FSB in favor of a serial bus interface. Nehalem will also come equipped with an optional integrated memory controller, which in combination with its serial bus interface will finally take away a serious advantage AMD has had since the introduction of the K8.

Nehalem will bring back SMT (simultaneous multithreading), which Intel hasn't had in its product lineup since the demise of the Pentium 4. Given that Nehalem will most likely be designed around SMT, we expect its implementation of the technology to be superior to what we saw in the Pentium 4/Xeon. Nehalem will also be quite modular, offering configurations of up to eight cores on a single chip (no word on the number of dies required for an eight-core configuration).

The final Nehalem bombshell is that some configurations may support on-chip graphics, as well. AMD has already announced a similar strategy for 2008/2009 with its Fusion project; Intel doing the same lends credibility to AMD's strategy even though it seemed to make sense from the get-go.

Although AMD has remained quiet for many of these disclosures, we're expecting that to change over the course of this year. Intel has turned up the heat but for the first time in a while, it looks like both AMD and Intel may have attractive products available at the exact same time in the marketplace. Consumers and CPU fans rejoice. ▲

Talk back to Anand at anand@cpumag.com.



Anand Lal Shimpi has turned a fledgling personal page on GeoCities.com into one of the world's most visited and trusted PC hardware sites. Anand started his site in 1997 at just 14 years old and has since been featured in USA Today, *CBS' "48 Hours" and* Fortune. *His site—www.anandtech.com—receives more than 55 million page views and is read by more than 2 million readers per month.*

Nehalem will also come equipped with an optional integrated memory controller, which in combination with its serial bus interface will finally take away a serious advantage AMD has had since the introduction of the K8.

The Shark Tank

by Alex “Sharky” Ross

Widescreening 1.0

Having a few PCs at home and at the shop means that they are all configured for different purposes. There are certain systems set up purely for gaming, others for Photoshop editing, and then others for Internet browsing and other office-related applications, and they all sport various display configurations.

It seems like a decadent way to compute, but 1996 was the last time I remember owning a single PC that “did it all,” and that was not by choice, either. Other than the gaming PCs, I have stuck with two displays for about nine years now—it’s really been that long since Matrox introduced DualHead. Today, just about every fellow geek friend I have is set up with a pair of identical LCD displays, usually 20.1-inch widescreens or better. My gaming PC has a Westinghouse 42-inch flat panel with a 1,920 x 1,080 resolution, but this still isn’t quite enough real estate for Internet Explorer, Outlook, Adobe Acrobat, Windows Media Player, QuickBooks, Word, and 5 trillion other windows all open. There’s no desk large enough to fit a pair of Westinghouses—that’s just loony bin stuff—so I decided it was time for me to try out a single, 30-inch widescreen LCD with a native resolution of 2,560 x 1,600, 6ms response time [gray-to-gray], and a 1,000:1 contrast ratio. And so enters the HP LP3065.

If you’re a high-end graphic designer who has worked with large screens all your life, perhaps you won’t be as completely bowled over by the sheer size of the HP LP3065 as some of us. I’m sure the *Titanic* was more impressive to a young lad in 1912, but I do not ever remember feeling quite so in awe. At 22 pounds, she’s no lightweight. Install the unit itself onto a sturdy, solid 9-pound stand, and you’re dealing with a 31-pound package here. Doing this gave me a flashback of my first upgrade from a 15-inch CRT to a 19-inch in 1997. If you’re a desktop publisher, the lack of any rotation to a Portrait mode will likely see all 31 pounds of it heading back the way it came. At least the height adjustments allow for around 5.1 inches up/down, and you can tilt/swivel until you find the right spot. The design is fairly frugal, and the thin, plastic bezel surrounding the screen itself is about as small as it can be.

In terms of the I/O features, HP really kept things to a minimum. It will take you a while to find any VGA, S-Video, or component video ports—because there aren’t any! So there will be no hooking up DVD players to this monitor; instead, you have three dual-link DVI-D (all HDCP capable) inputs and four USB 2.0 ports. Also, the majority of larger LCDs these days have built-in media card readers, but not the LP3065. The color gamut is an impressive 92% of NTSC, which is significantly higher than other LCDs. As with other 30-inch displays, there isn’t a built-in video processor, so you need to make all adjustments such as color and gamma (other than brightness) via your video card drivers.

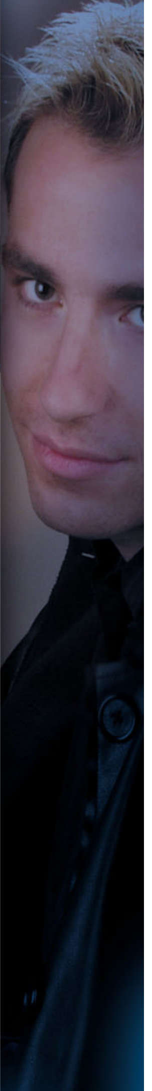
What else does the LP3065’s $1,699 price tag buy you? For starters, you get a pair of DVI cables, which is a nice touch. How many of you have purchased a 22-inch LCD only to find a cheapo VGA cable included and then have to run to your nearest Fry’s to pick up a DVI cable that the manufacturer should have included in the first place?

So why is 30 inches just not enough? If you scour the Internet and various price engines, you can find 24-inch widescreen LCDs for very reasonable prices. In fact, you can end up spending less on a pair of 24-inch screens (around $600 each) and still gaining more real estate for your desktop. For those of you, like me, that spend at least half the day with a million windows open and multiple applications open all at once, I still think it’s going to take some time to get used to going back to a single monitor. Mission failed: I find myself craving a second desktop and more room. At least when the next batch of Nvidia GPUs arrives, I’ll be able to more realistically dabble with some 2,560 x 1,600 gaming. ▲

Email me at sharky@cpumag.com

Disrupting Reuters’ newswire with a cheery Christmas greeting at age six, Alex “Sharky” Ross became an avid computer user/abuser, eventually founding popular hardware testing/review Web site SharkyExtreme.com. Exposing shoddy manufacturing practices and rubbish-spouting marketing weasels while championing innovative products, illuminating new technology, and pioneering real-world testing methods was just a front for playing with the best toys. The site acquired, he left in 2001. A London native and London School of Economics graduate, Alex currently overclocks/tunes Porsche 996 Turbos with www.sharkwerks.com when he’s not tweaking PCs.

> It seems like a decadent way to compute, but 1996 was the last time I remember owning a single PC that “did it all.”



PC Modder

Tips & Tutorials

Modding does the body good. A PC's body anyway, inside and out. Here you'll find hardware, firmware, tools, tips, and tutorials for modding your rig's performance and appearance. Send us your own mod-related tips and ideas at modding@cpumag.com.

Modding enthusiasts have a penchant for the latest toys. Fast processors, powerful video cards, silent SFF enclosures, and radically lit motherboards are all fair game when it comes to a modder's creative mind. Recognizing the appeal of unconventional customization, an entire industry has emerged to support the community.

Mods & Ends

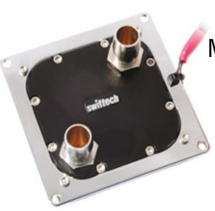
Swiftech MCW6500-T Thermoelectric CPU Water Block

Fans of liquid-cooling systems looking to boost the cooling performance of their rigs need look no further. The renowned liquid-cooling specialists at Swiftech have released a new water block that integrates a TEC (thermoelectric cooler) with a meticulously machined copper base featuring the company's patent-pending Diamond-Pin Matrix, which increases surface area for better heat dissipation. The Swiftech MCW6500-T ($159.95) also features 0.5-inch barb fittings and an all-copper cold plate that's machined, polished, and lapped to 0.0003-inch of flatness.

The MCW6500-T works much like traditional water blocks, but the TEC rests between the cold plate and base. The cold plate is cooled to temperatures well below ambient, while liquid flowing through the system dissipates the heat that the hot side of the TEC generates.

But because of the extra component, the MCW6500-T requires some additional considerations. For one, the TEC draws almost 25A of current and requires a 12V feed. You can connect it to a standard PSU, but Swiftech recommends an auxiliary power source. Users also must be aware of the possibility of condensation forming around the CPU socket. If temperatures fall below ambient room or case temperature, water droplets could form that could damage your hardware.

As of this writing, the MCW6500-T is compatible with Intel LGA775 systems, but an AMD version is in the works.



Swiftech's MCW6500-T TEC CPU water block can take your liquid-cooled rig to the next level with sub-ambient temperatures.

Coollaboratory Liquid MetalPads

Sick of messing with gooey thermal pastes? Want something a little easier (not to mention much cleaner) to use? The folks at Coollaboratory think they have the answer. The company has developed what it's calling Liquid MetalPads. Builders can use a pad in place of standard thermal paste for a processor heatsink installation. The Liquid MetalPads ($15 for three applications) work like other thermal pads but are made completely of metal. When the pads reach a certain temperature, they melt and fill in the tiny gaps between a heatsink and a CPU's heat spreader that hinder thermal transfer. Coollaboratory claims that correctly installed Liquid MetalPads perform as well as or better than most high-quality thermal pastes.

Coollaboratory's Liquid MetalPads can be used in place of messy thermal pastes without sacrificing cooling performance.

CoolIT Systems PCI Cooling Booster

Circulate more air over those hot expansion cards with CoolIT System's PCI Cooling Booster.

Although it's not much more than a 120mm lighted fan affixed to a slick retention bracket, CoolIT Systems' latest accessory for the PC can be a useful upgrade for users in need of some additional airflow over hot-running expansion cards. You can mount the PCI Cooling Booster ($24.99) in any standard ATX case and position it directly over your system's expansion cards. The fan connects to a standard 3-pin header and blows air directly at the expansion cards to keep them cool. If you have thermal issues because of an overabundance of expansion cards, sometimes the simplest cooling solutions work best.

Fashionably Fresh Firmware

Pentax K10D (v1.11)

A firmware update for the Pentax K10D digital SLR camera fixes an issue with RAW data when using multiple exposures and corrects the luminescence control when it's used in conjunction with the camera's built-in flash.

www.pentaximaging.com

Sony DRX-S50U (v1.D1)

An update for Sony's DRX-S50U external USB 2.0 DVD burner addresses compatibility issues with Windows Vista.

sony.storagesupport.com

Fuji FinePix S5 Pro (v1.04)

The firmware update addresses issues related to white balance.

www.fujifilm.com

by Marco Chiappetta

G80 Overclocking

Making The Fast Go Faster

By the time you read this, Nvidia's GeForce 8 series of products will have been on store shelves for roughly seven months. The more affordable GeForce 8800 GTS 320MB has arrived, the GeForce 8600 series will also join the initial GeForce 8800 GTX and GTS offerings, and AMD's next-generation ATI Radeons based on the R600 GPU will finally arrive at various prices. The DX10-compatible GPU landscape will change significantly, and prices on Nvidia's initial offerings will likely fall to much more affordable levels.

We figured this is the time many of you will take the plunge and migrate to a DX10-class graphics card (or cards). We also figured many of you would like to know exactly how to tweak these cards' performance to attain the maximum bang for your buck. With that thought in mind, we pulled together a trio of GeForce 8800 series cards—a top-of-the-line GeForce 8800 GTX, a 640MB GeForce 8800 GTS, and a mainstream 320MB GeForce 8800 GTS—and formulated a plan to overclock them beyond their stock frequencies to see just how fast they'd go in their out-of-box configurations. We all know how fast stock GeForce 8800 series cards are, but they have plenty of clock speed headroom left under their virtual hoods. By overclocking the cards, their performance can change dramatically.

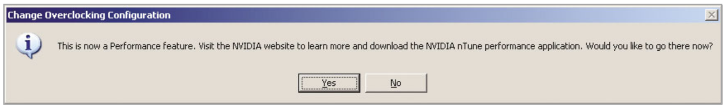
The Prep Work

Before we began overclocking the cards, we took the usual precautions. We can't stress enough the importance of keeping the cards cool while overclocking. Although we tested the cards in an open-air test bed, we still positioned a 120mm fan so that cool air was blowing directly over the cards at all times. The stock coolers should be more than enough for moderate to heavy overclocking, but it's still a good idea to ensure the coolest operation possible, so clean up that case to enhance airflow and add a fan or two to help vent excess heat out of the system.

We also needed to take a few extra steps to gain access to the overclocking options available within Nvidia's ForceWare drivers. In the past, a simple Registry tweak was all it took to enable the overclocking sliders, but that's no longer the case. With recent driver releases for the GeForce 8800 series, the age-old CoolBits Registry tweak no longer unlocks the hidden overclocking controls. If you enter the CoolBits tweak into the Registry and navigate through the driver menus looking for the overclocking tools, you'll be greeted by a notice that says overclocking is now a "performance feature" and that you'll need to visit the Nvidia Web site to download the nTune performance application.

So, in preparation for our overclocking project, we did just that. As of the time of this writing, nTune 5.05.25.00 was available for download on Nvidia's site. While there, we also grabbed the latest official drivers for the 8880 series for Windows XP, version 97.92. We should also note that there are many third-party tools available for overclocking graphics cards, such as RivaTuner, PowerStrip, and ATITool, but for the purposes of this article, we stuck with Nvidia's own tools to ensure the broadest compatibility.

Our GeForce 8800 GTX (center) is flanked by the more affordable GeForce 8800 GTS 640MB and 320MB cards.



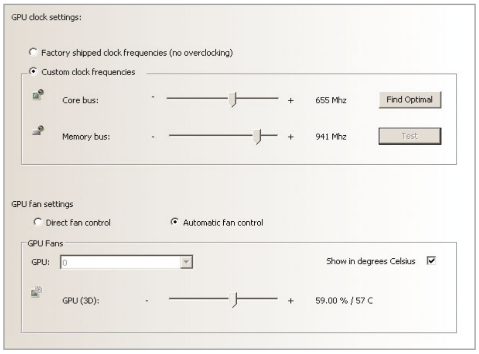
Change Overclocking Configuration

This is now a Performance feature. Visit the NVIDIA website to learn more and download the NVIDIA nTune performance application. Would you like to go there now?

Entering the CoolBits Registry tweak is no longer adequate to enable overclocking tools within Nvidia's ForceWare drivers for the 8800 series. Users are now required to download nTune to access the necessary options to overclock their cards.

Doing The Deed

Once we had installed the drivers and nTune, we were ready to overclock the cards. The procedure for overclocking all of the Ge-Force 8800 series cards is exactly the same. The only things that will change are the frequency ranges for the GPU and memory. By default, a stock GeForce 8800 GTX has a GPU clock speed of 575MHz and a memory clock speed of 1.8GHz. Reference GeForce 8800 GTS cards are supposed to be clocked at 500MHz (GPU) and 1.6GHz (memory), but they typically ship with actual clock speeds of 513MHz and 1.584GHz, respectively. Excluding preoverclocked cards that usually feature specially binned GPUs and memory that are capable of running at higher frequencies, you can expect most standard GeForce 8800 GTX cards to hit approximately 620MHz for the GPU and 1.9GHz for the memory. 8800 GTS cards, on the other hand, have been known to hit 650MHz/1.85GHz (GPU/memory) speeds. Keep in mind that these are only rough guidelines; overclocking is never guaranteed. One card may hit astronomical frequencies with no modifications, while another may not budge at all.



GPU clock settings:

○ Factory shipped clock frequencies (no overclocking)

● Custom clock frequencies

Core bus: 655 Mhz

Memory bus: 941 Mhz

GPU fan settings

○ Direct fan control

● Automatic fan control

GPU Fans

GPU: 0

Show in degrees Celsius ☑

GPU (3D): 59.00 % / 57 C

While overclocking, it's best to increase the GPU core and memory frequencies individually, by only a few megahertz at a time, and testing for stability between each step. Sometimes the drivers will accept a certain frequency when in actuality it is unstable.

To overclock a GeForce 8800 using nTune, navigate to the Nvidia control panel and click the Performance icon. This will present you with a number of menus labeled Manual Tuning, Automatic Tuning, and Management. In the Manual Tuning section, there will be an option labeled Adjust GPU Settings; click that link to access a new menu with sliders used to adjust the core bus and memory bus frequencies. Core bus refers to the GPU itself, and the memory bus obviously refers to the memory speed.

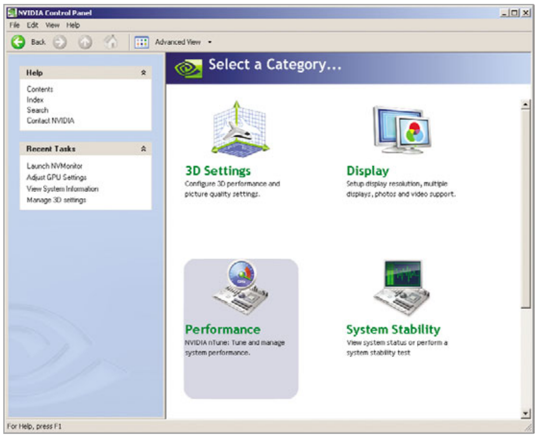
Eventually, Nvidia may offer a third option in this menu with a slider for adjusting the clocks of the stream processors that reside within a G80 GPU, but that option was unavailable at the time of this writing. If you'd like to further experiment with stream processor overclocking, however, you can modify the card's BIOS to overclock the stream processors. We explained how to do this using NiBiToR and nVFlash in the April 2007 issue. (See page 38.)

Once you've accessed the Adjust GPU Settings menu, overclocking the card requires little more than a bit of trial and error. There is an option that will attempt to automatically find the optimal frequencies for your card, but we, along with a multitude of other users, have found it a bit buggy with nTune. We tried the Find Optimal button with all three of our GeForce 8800 series cards, and we were met with a blank, grey screen and a hard lock of our system every time. You can give it a shot, but manual overclocking will likely yield the best results.

To begin the actual overclocking process, click the Custom Clock Frequencies radio button. This will unlock the frequency sliders and let you manually adjust them. Start with the core bus slider and slowly raise it 5 to 10MHz at a time. Each time you make a change, you'll need to click on the Test button to determine if the GPU is capable of running at the new desired frequency. You can safely increase the frequency until the test fails, at which point we recommend backing off a few megahertz and testing for stability with a game or benchmark that you know will tax your graphics card. Once you're certain the new GPU clock is stable, start raising the memory bus frequency. Follow the same procedure as outlined above, raising the frequency slightly and clicking the Test button as necessary.

Maintain Stability

When you've found the apparent maximum stable GPU and memory frequencies, you should thoroughly test for stability. We've found that nTune will occasionally validate frequencies that are actually too high for the cards in the long term. The cards will pass the test built into the application but won't be stable over extended periods of time. Because of this, we recommend looping a benchmark (3DMark06 works well) or playing a game for at least a few hours; monitor the GPU temperature



3D Settings: Configure 3D performance and picture quality settings.

Display: Setup display resolution, multiple displays, photos and video support.

Performance: NVIDIA nTune: Tune and manage system performance.

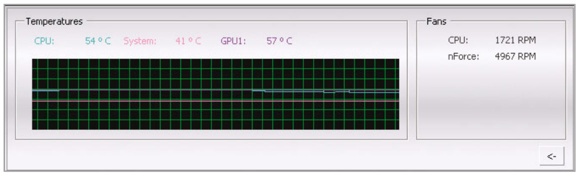
System Stability: View system status or perform a system stability test

For Help, press F1

There are plenty of third-party overclocking utilities, but Nvidia's own software is consistently the most compatible with its hardware.

at the same time. If the system remains stable and temperatures don't creep into the danger zone, the new, increased frequencies should be relatively safe to use.

To access the thermal monitor built into nTune, open the Nvidia Control Panel once again and click the Performance icon. In the Management menu, you'll see an option to launch NVMonitor. Click that link and, in the window that opens, click the small arrow in the lower-right corner. This opens a window that graphs CPU, system, and GPU temperatures over time. If after a few hours of gaming this graph doesn't indicate excessive temperatures, it's safe to assume that you won't have any heat-related instability. If, however, temperatures do rise to excessive levels (anything above 90 degrees Celsius for the GPU is a concern), we advise that you either lower the GPU and memory frequencies a bit, incorporate some additional cooling into the system, or both.



After overclocking your card, monitor its temperature over an extended gaming session to ensure it isn't overheating.

Sit Back & Enjoy

Once the work is done, it's time to kick back with your favorite game and enjoy the fruits of your labor. If you've done everything right, you'll be enjoying higher frame rates in all of your games with little more than a few hours of tweaking. ▲

by Marco Chiappetta

Performance: Before & After The Mod*

We ran a handful of popular benchmarks at a variety of resolutions using a Core 2 Extreme X6800-powered test bed to see the performance increase of each overclocked card. The results paint an interesting picture. The most powerful card of the group, the GeForce 8800 GTX, showed the smallest performance gains percentage-wise and was CPU-limited in a few of the test configurations. With a card as powerful as the GeForce 8800 GTX, even today's fastest processors can cause performance bottlenecks in some instances. On the other hand, the "mainstream" GeForce 8800 GTS cards showed some rather significant performance gains, especially at 1,600 x 1,200 and 1,920 x 1,200. But once we raised the resolution to 2,560 x 1,600, their fewer stream processors and smaller frame buffers held them back. This was especially the case with the 320MB card. With F.E.A.R. and Half Life 2: Episode 1, the 320MB GeForce 8800 GTS' smaller frame buffer had a major impact on performance and caused frame rates to drop considerably.

In the end, however, our benchmarks show that overclocking any GeForce 8800 series card is well worth the effort. The fastest of the cards became even faster, and the more affordable GTS cards got a hefty boost in performance, sometimes over 20%.

	GeForce 8800 GTX Stock frequencies: 575MHz/1.8GHz (GPU/memory)	**GeForce 8800 GTX** Overclocked frequencies: 625MHz/1.9GHz	**Performance Increase**	**GeForce 8800 GTS** Stock frequencies: 513MHz/1.58GHz	**GeForce 8800 GTS** Overclocked frequencies: 652MHz/1.86GHz	**Performance Increase**	**GeForce 8800 GTS 320MB** Stock frequencies: 513MHz/1.58GHz	**GeForce 8800 GTS 320MB** Overclocked frequencies: 655MHz/1.88GHz	**Performance Increase**
F.E.A.R. v1.08									
1,280 x 1,024	110	113	2.73%	81	87	7.41%	76	88	15.79%
1,600 x 1,200	80	86	7.50%	59	64	8.47%	46	52	13.04%
1,920 x 1,200	70	73	4.29%	51	58	13.73%	34	41	20.59%
2,560 x 1,600	34	36	5.88%	17	20	17.65%	13	15	15.38%
Half Life 2: Episode 1									
1,280 x 1,024	138.43	138.51	0.06%	124.56	132.87	6.67%	124.86	133.63	7.02%
1,600 x 1,200	122.75	124.06	1.07%	96.97	106.14	9.46%	96.14	106.32	10.59%
1,920 x 1,200	111.72	113.14	1.27%	81.87	93.18	13.81%	76.31	88.64	16.16%
2,560 x 1,600	61.18	63.87	4.40%	39.95	47.12	17.95%	21.16	24.51	15.83%
Quake 4 v1.3									
1,280 x 1,024	150.2	151.4	0.80%	135.6	142.3	4.94%	133.1	141.4	6.24%
1,600 x 1,200	137.9	138.8	0.65%	113.2	125.6	10.95%	110.9	122.1	10.10%
1,920 x 1,200	127.3	130.5	2.51%	99.7	117.5	17.85%	89.7	110.9	23.63%
2,560 x 1,600	80	85.3	6.63%	52.8	56.8	7.58%	52.9	55.3	4.54%
Prey v1.2									
1,280 x 1,024	134.5	140.6	4.54%	97.1	110.1	13.39%	98.4	111.2	13.01%
1,600 x 1,200	100.8	106.7	5.85%	72.1	81.4	12.90%	72.7	82.4	13.34%
1,920 x 1,200	85.3	90.1	5.63%	62.3	70.2	12.68%	63.1	71.8	13.79%
2,560 x 1,600	50.7	53.8	6.11%	32.3	37.3	15.48%	32.4	37.8	16.67%

*All benchmarks were run with 4XAA/16XAF.

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> “. . . on the subject of AMD’s future-generation quad-core CPU, code-named Barcelona, we would be careful placing bets on any of these boards.”

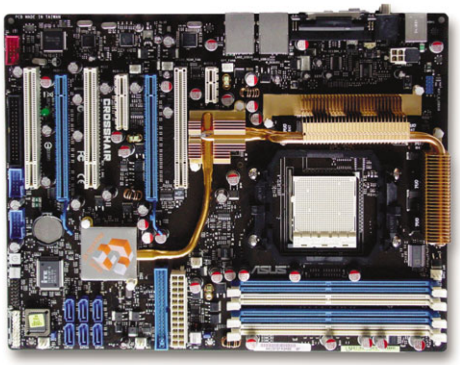
Each month we dig deep into the mailbag here at *CPU* in an effort to answer your most pressing technical questions. Want some advice on your next purchase or upgrade? Have a ghost in your machine? Are BSODs making your life miserable? *CPU*’s “Advanced Q&A Corner” is here for you.

James P. asked: I’m planning on overhauling my computer and need a new motherboard. I’m a fan of AMD, and, if possible, I would like to keep up-to-date on what is coming up for its future quad-core products. I have been checking out motherboards, but I’m not really sure what to look for. I want something that is good for overclocking and has a good setup for a powerful video card. I’m going to use my system mostly for animation and 3D rendering, with some gaming on the side.

A: The latest high-end chipset offerings for AMD’s socket AM2 platform come in the form of Nvidia’s nForce 590 SLI and AMD’s ATI-based RD580. Although AMD recently introduced its 690G series chipsets with integrated, low-end ATI Radeon graphics cores, you mentioned that you want a motherboard that can support high-end graphics, so we’ll rule that chipset out. Furthermore, there aren’t nearly as many RD580 motherboard offerings on the market either. So, if you’re interested in a dual-GPU CrossFire Radeon graphic setup, there are slimmer pickings on that side of the fence. There are, however, many motherboards available that are built on the nForce 590 SLI family. Depending on your budget and required features, we’d recommend the following.

Gigabyte’s GA-M59SLI-S5 is a solid motherboard that has three PCI-E x16 slots (one with an x8 lane configuration) for excellent expansion potential and supports dual-GPU graphics. The board also comes with dual Gigabit Ethernet and an eSATA port for external backup. Also, we’ve found that the GA-M59SLI-S5 is a competent overclocker. In that vein, Abit’s Fatal1ty AN9 32X nForce 590 SLI motherboard is also an outstanding choice. The board has two x16 PCI-E graphics slots, dual Gigabit Ethernet, and active cooling with two exhaust fans pointing out its I/O panel for VRM cooling around the CPU socket.

One of our favorite nForce 590 SLI boards is the Asus CrossHair nForce 590 SLI ROG (Republic Of Gamers). We even gave it our “Editor’s Choice” award at HotHardware.com. The CrossHair is really decked out with all the trimmings: It comes with dual x16 PEG slots, an x4 PCI-E slot, an x1 PCI-E slot, and three PCI slots for lots of flexibility with expansion options. In addition, the board has a great heatpipe chipset and VRM cooling features and the de facto nForce 590 SLI setup: dual Gigabit Ethernet on the board’s back I/O panel. What’s perhaps even more interesting on the board’s I/O plate is that all of the board’s I/O port labels light



The Asus CrossHair nForce 590 SLI motherboard comes with dual x16 PEG slots, an x4 PCI-E slot, an x1 PCI-E slot, and three PCI slots that offers of flexibility with expansion options.

up with a special electroluminescent backing, which helps you plug in peripherals in the dark confines of your desktop area. Add to all of this a wealth of overclocking potential in the board's BIOS along with rock-solid stability, and we were in love.

In terms of RD580 motherboards, if CrossFire graphics is your goal, we'd recommend the Asus M2R32-MVP or ECS KA3 MVP Extreme for a bit less money than some of these higher-end nForce boards. However, they have fewer features with only single Gigabit Ethernet connectivity and fewer PCI-E expansion options.

Finally, on the subject of AMD's future-generation quad-core CPU, code-named Barcelona, we would be careful placing bets on any of these boards. Even though the pinout of the new integrated quad core will be the same, power requirements will be different, and existing VRM features on some of these motherboards may not support it. It's possible the Asus CrossHair's eight-phase power array might be able to pull it off, but until we get our hands on a chip, that remains to be seen. Also, we've heard AM2+ chips (reportedly what Barcelona will be based on) will work with some AM2 motherboards but will then have to fall back to HyperTransport 2.0 at 1GHz vs. the chip's HyperTransport 3.0 2GHz-plus capability, as well as a single power plane for its cores and integrated memory controller. So, in short, if you're really jonesing for a single-chip quad-core AMD rig, it might make sense to wait it out a bit; say until sometime in the middle of this year.

Christopher P. asked: **I bought a Linksys WRT54G wireless router so that my fiancé and I could share one Internet connection in our apartment. As soon as I plugged the router in, it worked fine with my cable modem service and everything was OK for a few weeks. But we recently went on a vacation, and when we got back, neither of us could wirelessly connect to the network. We're both getting a WEP error. I know WEP is a security thing, but I don't remember ever setting it up. If we connect our laptops to the router with an Ethernet cable, we can access the Web, but we can't sync up on the wireless connection anymore. What's going on?**

A: It sounds like you left your router setup with its default out-of-the-box configuration and someone took control of your network and enabled WEP while you were away. You may be a victim of a wardriver. Wardrivers/wardriving is a term used to describe people who drive around looking for unprotected wireless networks. In your email you mention you live in an apartment, so it's possible someone in your building found your network by searching for an available network connection. If you left your router in its default configuration while you were on vacation, the wardriver could then log into your router, enable WEP, and keep your wireless connection all to himself. We know this sounds a little nuts, but it happens all the time. However, it's not always malicious because some folks will do this to inform less savvy users that their networks are unprotected and they need to secure them.

What you should do is connect to your router via an Ethernet cable and then reset your router to its factory configuration by holding down the reset button on the back of the unit for a few seconds and cycling the power. Then, once the router is reset, immediately log into it, change your SSID and your router login password, and enable a stronger form of wireless protection, preferably WPA or WPA2 (if it's available). If you're unsure how to log into your router, there should be instructions in its installation manual. Log-ging in to your router is usually fairly easy: All you have to do is enter the router's internal IP address into your Web browser (it's probably 192.168.0.1 or 192.168.1.1) and then enter the default username and password. For that router, leave the username blank and use the password "admin" to log in. While you're at it, we'd also recommend updating your router with the latest firmware, which should be available on Linksys' Web site. ▲

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Cisco Systems
Power
DMZ
Wireless-G
WLAN
1
2
3
4
Internet
Wireless-G Broadband Router with SpeedBooster
Model WRT54GS
LINKSYS

It's always a good idea to change a router's default password and enable some form of wireless security to keep unwanted users off your network.

by Dave Altavilla and Marco Chiappetta,
the experts over at HotHardware.com

For bonus content, subscribers can go to
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ElectriPlast

A New Twist On Plastic

Many products show promise, but they may never move beyond that stage. A great idea isn't always enough; an inventor has to carry that idea through to the marketplace, convincing users and suppliers that the idea will work and, ultimately, be profitable.

Sometimes when that idea doesn't grab the attention of the market in the first few years, perseverance becomes almost as important as the good idea. Integral Technologies (www.itkg.net) is hoping its perseverance pays off soon with its ElectriPlast technology. The company first developed ElectriPlast at the beginning of this decade but finally is just beginning to see the possibility of market successes.

What Is It?

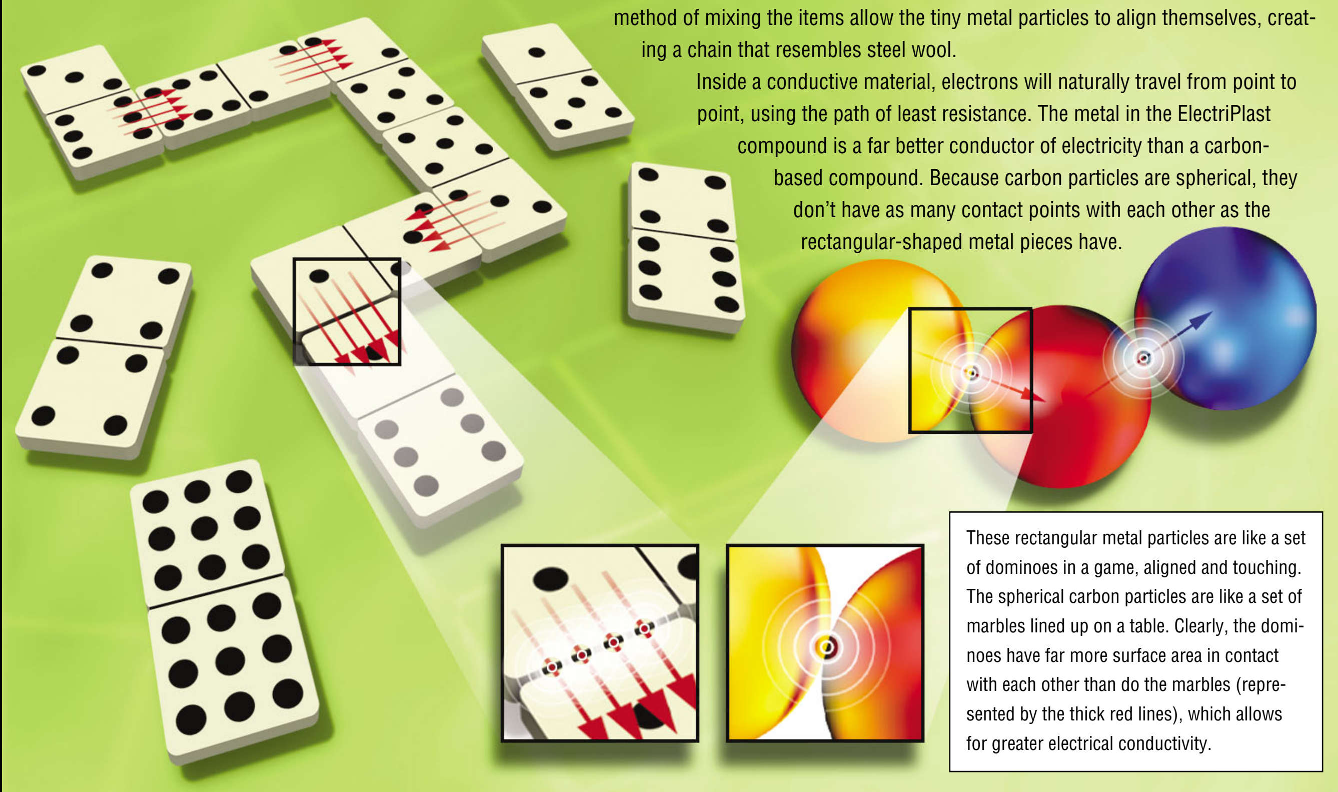
ElectriPlast conducts heat and electricity like most metals; some call it a plastic-metal composite. ElectriPlast has hundreds of potential uses, including as an antenna that covers the entire body of a cell phone—like a "jacket" for the phone. Integral calls this jacket PlasTenna and says it will help improve cell phone signal strength and reliability.

Integral formulates ElectriPlast into pellets that contain varying conductive

How ElectriPlast Works

To create ElectriPlast, Integral starts with micron-sized pieces of metal. Those pieces are mixed with a plastic resin in a unique way to create ElectriPlast. Robinson says Integral's method of mixing the items allow the tiny metal particles to align themselves, creating a chain that resembles steel wool.

Inside a conductive material, electrons will naturally travel from point to point, using the path of least resistance. The metal in the ElectriPlast compound is a far better conductor of electricity than a carbon-based compound. Because carbon particles are spherical, they don't have as many contact points with each other as the rectangular-shaped metal pieces have.



These rectangular metal particles are like a set of dominoes in a game, aligned and touching. The spherical carbon particles are like a set of marbles lined up on a table. Clearly, the dominoes have far more surface area in contact with each other than do the marbles (represented by the thick red lines), which allows for greater electrical conductivity.

Integral can adjust the number of particles in the pellets to change the conductivity properties of a particular batch of ElectriPlast to meet the needs of each individual company. Some companies want an antenna-like product, some want an RF shield, and others want to mimic metal. By increasing the number of particles (increasing the conductive doping concentration), more particles touch, and electrons move more quickly and freely. Reducing the conductive doping concentration slows the flow of the electrons and increases resistance.

Using this method, Integral can create several ElectriPlast formulas. For example, one formula could carry the conductive capabilities of a metal, such as copper, but retain the flexibility and structural characteristics of a plastic. Integral selects from thousands of commercially available resins—ranging from rubber to plastic—to create ElectriPlast. A company can tell Integral what type of material it wants to use or simulate, and Integral can construct an ElectriPlast formula to match those specifications.

Integral creates pellets from the resin. All of the pellets are similar sizes regardless of the ElectriPlast formula they contain. Each pellet measures about 3/16 of an inch in diameter and about 1/5 of an inch in length. Integral molds the ElectriPlast material into a rope- or cord-like shape and then cuts it to form the pellets. ▲

Source: Integral Technologies

properties. A company selects the properties it wants, and then Integral can mold the pellets into any shape without losing the conductivity. Many ElectriPlast recipes can match the strength and durability of metals, says Integral, but the material weighs 40% less than aluminum and 80% less than copper.

ElectriPlast's Development

About seven years ago, the idea for ElectriPlast was born while Integral was looking for a way to improve communications between the ground and satellites using a flat antenna design. William Robinson, CEO of Integral, says in developing the flat antenna Integral used galvanized metal, which worked well, but cutting the metal opened it to the possibility of rust. "We decided we should try to find another material that was like a metal but was plastic so that we could keep it sealed," Robinson says. "There was nothing like that in the marketplace at the time."

Current options for conductive polymers only work with low-voltage and low-current situations. Increasing the current in the polymer makes the compound brittle. Integral decided to look for other options and ended up developing ElectriPlast.

Most companies use a "salt and pepper" method to add micron-sized metal particles or metal powder particles to resin to create a conductive polymer. But this method can lead to spotty performance because there isn't a pattern or formula for adding the particles. With ElectriPlast, however, Integral uses several patented methods to more carefully align the tiny metal particles in the resin.

Beyond a cell phone jacket-like antenna, ElectriPlast has many potential uses. A roof rack on a car could become a strong antenna, for example. With ElectriPlast, a heated plastic seat in a car could radiate the warmth throughout its surface, a plastic circuit board wouldn't need solders or metal connectors, and the material could replace copper wiring in airplanes, making the planes lighter.

Going To Market

As Integral began marketing ElectriPlast several years ago, Robinson says the company made a serious mistake by trying to take the technology directly to end-user companies instead of dealing with the companies that supply those end users. That mistake greatly slowed the potential growth of ElectriPlast. "They want their suppliers to bring them the new invention or the new widget," Robinson says. "They don't want to deal with more companies. But now the supply chain is starting to phone us."

Integral now is awarding licenses (for about $1 per license) to companies that want to use ElectriPlast technologies in their products. "We just want to sell this material on a per-pound basis or a per-kilogram basis," Robinson says. "Then we'll have the world figure out what to do with ElectriPlast."

In the first half of 2007, a third-party facility was completing the chemical and electrical testing of ElectriPlast pellets. Robinson says he hopes Integral will see more patents approved by the end of 2007 and hopes to begin selling pellets by the end of the year. Although he says he's not quite sure when customers will be able to purchase cell phones with PlasTenna, Robinson thinks the long wait for Integral to see its product in the marketplace is nearly over. "We're talking with the top one or two manufacturers of cell phone bodies," Robinson says. "They're putting a lot of pressure on us to get the testing done. The design cycles are 12 to 18 months out, so I'd be thrilled if we made enough impact to see phones [with PlasTenna] in late 2008." ▲

by Kyle Schurman

Cell Phones Lose Antennas, Get "Jackets"

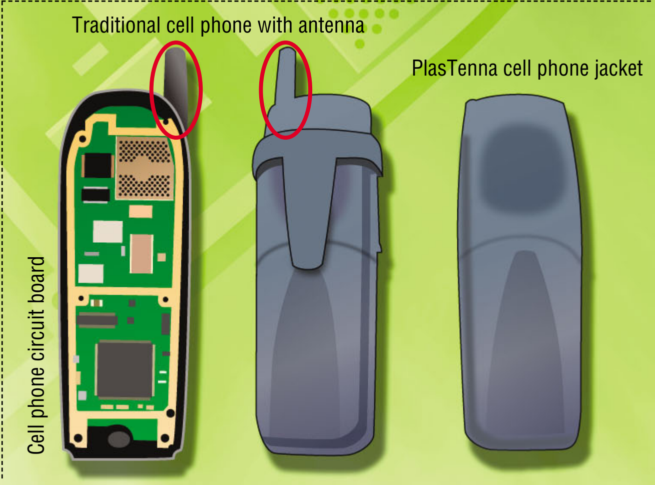
William Robinson says using ElectriPlast to create a "jacket" for a cell phone that serves as the phone's antenna was one of the company's first ideas for the technology.

With a traditional cell phone antenna, the angle of the signal is important because with a small antenna a signal could hit it and bounce off. But using ElectriPlast as an antenna, called a PlasTenna, that covers the entire phone gives it a greater chance of absorbing the signal and provides more signal strength when sending data. Robinson says Integral has created a working PlasTenna that's only 1/10,000 of an inch in thickness.

Cell phone antennas don't occupy a large area; however, in a device as small as a cell phone, free space is at a premium, and removing the traditional antenna would give designers more options. "The antenna is the last thing they think about," Robinson says of cell phone designers. "An ElectriPlast antenna gives designers more real estate. There's more room on the inside if the antenna is moved to the outside. Plus it's exposed to the outside, not under the phone's shell."

Robinson says Integral's designers were surprised how easy it was to make an ElectriPlast antenna work with an existing cell phone. The designers simply removed a flat panel on the phone and replaced it a flat piece of ElectriPlast.

Integral has developed PlasTenna units with several frequencies, including 2.4GHz, 1.9GHz, 1.56GHz, 850MHz, 400MHz, 148MHz, and 137MHz. ▲


Traditional cell phone with antenna
PlasTenna cell phone jacket
Cell phone circuit board

Sources: Integral Technologies, HowStuffWorks.com

Troublemaker Digital

The Crew That Put The Grind In "Grindhouse"

The more time you spend walking the halls of Troublemaker Studios, the stronger the weird feeling you've had since you pulled up to the security gates outside grows in your gut. The feeling doesn't surface because this is the place Robert Rodriguez, the guy who owns the joint, shot "Sin City" and "Planet Terror." It's not that it's rainy and overcast or the studios sit on a now mostly abandoned airport in east Austin, Texas. It's not because a zombie-whacking helicopter is within chopping range or a life-sized figure of Marv guards the main hallway. It's not the guilt you feel because you're touching actual "Spy Kids" props and your kids aren't here to enjoy it. Hell, it's not even that Quentin has walked these grounds. No, the weird vibe inside Troublemaker Studios comes from the artists who work there—they seem totally unaware how cool this all is or how influential their work in digital filmmaking has become. It's a good weirdness you feel at Troublemaker Studios.

The same day "Grindhouse" premiered in Los Angeles in late March, we visited Troublemaker in Austin, Texas, where Rodriguez shot much of "Planet Terror" on location. Inside, the conceptual artists in Troublemaker's Digital department generously showed us sketches, 3D models, animatics, and other early and refined conceptualizations of Cherry Darling's bullet-popping leg, the virus-infected Sickos, and "Planet Terror's" other inhabitants.

By now, you've either seen or are surely aware of "Planet Terror," Rodriguez's contribution to the guilty pleasure that is "Grindhouse." Along with Quentin Tarantino's car-romp "Death Proof," "Grindhouse" is a nod to a 1970s style of filmmaking in which filmmakers were creative on the cheap. The results often were absurdly wonderful, unrealistic horror and exploitation flicks. Depending on your taste for zombies, fast cars, and gore, Rodriguez and Tarantino's "Grindhouse" is the best night at the movies in years.

As Rodriguez and Tarantino intended, "Grindhouse" is a movie-going experience full of cheesy trailers, trashy movie posters, blood, car crashes, stilted acting, gaps in plot logic, guns, explosions, zombies, cute

TECH THAT GRINDS

Speaking with Kris Bushover, Troublemaker Digital's technical guru, you get the feeling there are few technical obstacles he can't work around. Considering Troublemaker already has made the considerable leap to shoot and render in high-def, as well as output two digital 3D movies—"The Adventures of Sharkboy and Lavagirl" and "Spy Kids 3"—in recent years, it's no wonder. For "Planet Terror," Bushover revamped the studio's rendering farm in order to greatly reduce local render times.

Without reworking the farm's configuration, Bushover says, local renders would have taken up to 56 hours per reel—a scenario that wasn't agreeable with director Robert Rodriguez. Rendering frames with the pivotal "damage" placed on top of color-corrected frames was partially to blame for the lengthy renders. Bushover's task was to cut the rendering time per reel to single-digit territory. Bushover's work eventually led to an 8TB farm that sits behind a glass wall in Troublemaker Digital's offices.

The eight Verari-built systems in the farm each house dual dual-core AMD Opterons with Red Hat Linux ES3 running Autodesk Burn. Bushover networked the rigs with fiber optic to the StoneFS storage Troublemaker's Autodesk Flame-based workstations use. The SGI Tezro workstations, which have 4TB of local storage each, power on quad MIPS-based processors and run Irix 6.5.3 and Flame 9.5.11. Bushover and conceptual artist Rodney Brunet agree the ability to turn out revisions quickly let Rodriguez get more creative with the look of the "damage." "The AMD-based farm allowed us to render complete reels in just under seven hours," Bushover says. ▲

girls, mad killers, and quirky characters galore. "Grindhouse" also features intentionally rotten video quality, a tribute to the fact that original grindhouse movies were shot for peanuts, and often only one reel existed to share among theaters. Add in that for reasons not entirely wholesome, projectionists often snipped out frames they wanted for themselves and spliced the movie back together, and you get the constant scratches, pops, hisses, burn spots, and missing frames that populated the films.

To create this aged effect for "Planet Terror," Rodriguez—who has shot digitally since "Spy Kids 2"—and his digital effects crew experimented with light, medium, and heavy doses of "damage," or the digital equivalent of those scratches and flaws. Underneath the damage is Cherry Darling's deadly stump-gun, zombie-slashing helicopter blades, explosions, blood, bodies, and other digitally created goodness. (Tarantino, a long-time grindhouse fan who owns many original reels, shot "Death Proof" on film.)

Bound For Trouble

Our time with Troublemaker Digital wouldn't have been possible without AMD, which has offices near the studios and has a working relationship with Rodriguez, providing Troublemaker with Opteron-based systems that both the artists and local rendering farm use. As with "Sin City," Troublemaker used AMD equipment to power various "Planet Terror" tasks. (See the "Tech That Grinds" sidebar.)

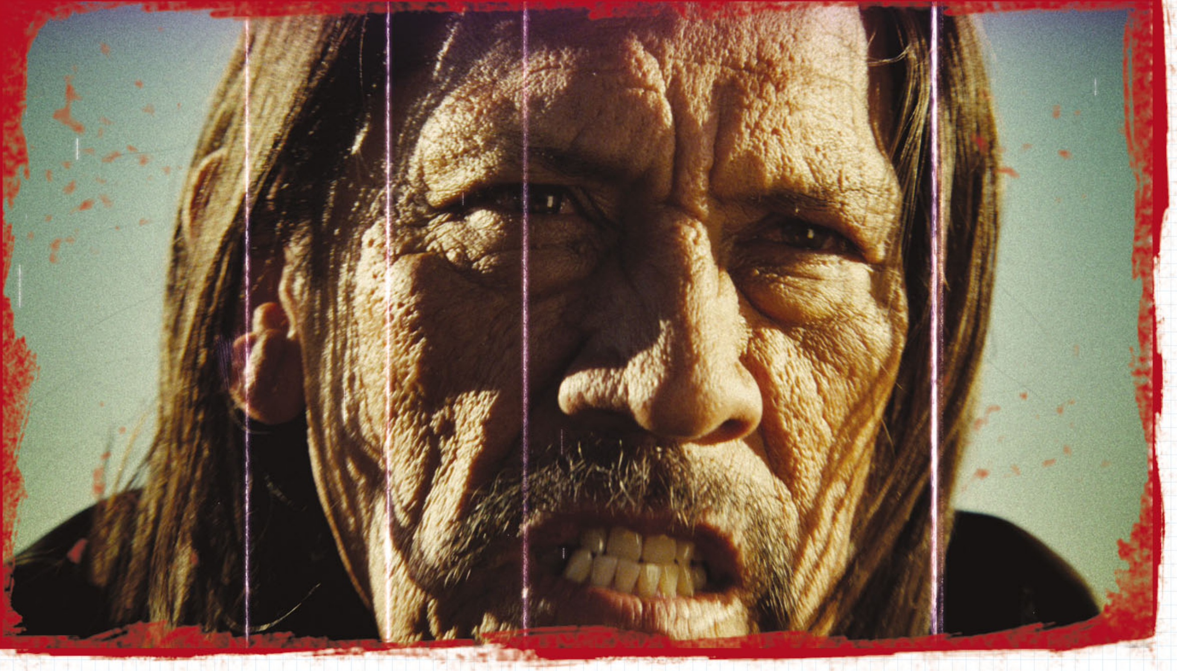
In 2004, *CPU* went to Dallas to see AMD dual-Opteron-based DAW64 workstations record Eric Clapton's Crossroads Guitar Festival live (August 2004 *CPU*, page 94). The pro engineers and mixers we spoke with there who use DAW64s left us impressed, as did AMD's digital audio and video entertainment Live! initiative (www.amdlive.com). We wondered if we'd feel the same about AMD's presence in films. To its credit, we did. It didn't hurt that Troublemaker's brilliance at pulling the darkness out of Frank Miller's "Sin City" graphic novels comes up often during *CPU* movie discussions, as does Rodriguez's influence on Miller's "300" and our love of "From Dusk Till Dawn," which Tarantino wrote and Rodriguez directed.

Inside Troublemaker. Driving to Troublemaker winds you through residential neighborhoods until you reach security gates overgrown with vegetation. Behind the gates is the large airline hanger that Troublemaker fills. The first Troublemaker we meet inside is Rodney Brunet. Like many of the conceptual artists who work with Rodriguez, Brunet met Rodriguez while working at Digital Anvil, an Austin, Texas,-based gaming company. Brunet freelanced for Rodriguez before joining Troublemaker full time with "Spy Kids 2."

As with the other artists, Brunet is encouraged to dip his hands in many pies, including creating early character illustrations (he was doing preliminary work for a possible "Sin City 2" when we left), compositing, and more. Besides directing, Rodriguez's own credits include writer, producer, editor, director of photography,

CPU AT THE GRINDHOUSE

Released April 6, 2007, to mostly favorable reviews, "Grindhouse" made just less than $12 million opening weekend. Obviously, Easter weekend and "Grindhouse's" three-hour-plus length played roles in the low box office take. At press time, The Weinstein Company was mulling the idea of re-releasing "Grindhouse's" two movies separately. The consensus among *CPU* staffers who've seen "Grindhouse," however, seems to be that "Planet Terror's" dizzying action, gore, tension, and utter lack of believability make for a better ride than Tarantino's dialogue-heavy "Death Proof." Still, Kurt Russell is pure gold as good guy/psycho Stunt Man Mike. Nearly as good are the wickedly mouthwatering fake trailers that Rob Zombie, Eli Roth, and Robert Rodriguez crafted. Rodriguez already has plans to make his "Machete" trailer into a full-length feature. Sweet. ▲



production designer, visual effect supervisor, sound designer, re-recording mixer, and composer, which he does in a Skywalker audio-worthy studio.

Reportedly, George Lucas turned Rodriguez onto filming digitally in HD. Most people we spoke with who work with Rodriguez told us he doesn't bow to limitations. After conjuring up fantastic digital worlds for 2002's "Spy Kids 2," Troublemaker tackled 3D for 2003's "Spy Kids 3" and 2005's "The Adventures of Sharkboy and Lavagirl." The groundbreaking use of the green screen to portray the seediness of Miller's "Sin City," however, was the big digital payoff from Rodriguez for most adult fans.

As Charlie Boswell, director of AMD's digital media and entertainment division, describes, some directors "compromise their visions to fit the technology." Rodriguez, conversely, "is a storyteller, and everything conforms to the story." Boswell likens Rodriguez to Lucas in that if "the tools aren't available to tell the story, they find them or invent them." AMD's aim is to provide Troublemaker the tools necessary to realize Rodriguez's vision from the outset.

"Robert works at the speed of thought," Boswell says, meaning "there's not time for flakey hardware." Boswell, an engineer and one-time dabbler in filmmaking, uses many metaphors while describing AMD's involvement in digital entertainment, including "the blue screen of death is like the death of a child to the process," "composing in the moment," "computers can be a buzzkill to the creative process," etc. AMD's involvement, however, seems to really come down to helping artists capture their visions in the moment without worrying if the technology required to do so will freeze.

Boswell, who was in Los Angeles for the "Grindhouse" premiere during our visit to Troublemaker, says the film is a period piece, with the biggest challenge being the creation of the film's low-tech damage effect. "'Grindhouse' is a leap into the past. That tells me [Rodriguez] is thinking outside the box," Boswell says. "Robert is important to us because there is no other choice with him. You either keep up with him or he looks for another partner."

Upstairs, downstairs. Downstairs at Troublemaker is the production area. Everywhere there are signs of creativity, including massive George Yepes' paintings inspired by Salma Hayek; the 30-foot tall green screen along one wall; and props and sets stacked away, including Kadie's Bar where Mickey Rourke owned Marv and Jessica Alba twirled her rope. Rodriguez is known to hire local carpenters, costume designers, painters, etc. during productions.

Upstairs is Troublemaker Digital, where a handful of artists work with Rodriguez to conceptualize the look and feel of his movies, mocking up ideas into 2D and 3D content, including everything from hand sketches and 3D animatics, which are particularly helpful in planning special effect sequences. (See the "A Gun To Stand On" sidebar for "Planet Terror" animatics examples.) The conceptualizations also often include small figures, models, props, and anything else Alex Toader can carve out on the CNC (computer numerical control) mill he started using with "Spy Kids 2." The mill, which sits in a corner of his office, is connected to an AMD-based Voodoo notebook. Toader's creations, or "inspirational art," as well as sketches of Cherry Darling, Sickos, and other "Planet Terror" characters, fill his office.

A GUN TO STAND ON

Just how does Cherry Darling come to possess a machine gun-firing leg, anyway? CG, of course. To fit Cherry with her bullet-blazing prosthetic, Troublemakers Alex Toader and Chris Olivia started with sketches and animatics to create the gun's look. These helped shape the gun's final design, which Troublemaker's production department created a prop for that was in turn used to create the CG version.

While showing us several animatics and CG examples, Toader told us Troublemaker initially fitted Rose McGowan, who plays Cherry, with a green, LED-based boot to automatically track leg movements. When the boot proved impractical for various reasons, they fitted McGowan with a gray bandage instead, which meant manual tracking. In one sequence in "Planet Terror," McGowan faces off with a Sicko played by a stuntman that ends with Cherry's gun blasting the Sicko through a door with fire and smoke surrounding him. In actuality, Rodriguez filmed the stuntman and McGowan separately.

"Robert combined several takes," Brunet says. "He liked the way the stuntman broke through the door on the take without pyro. The pyro is

Toader demonstrated several examples of CG use in "Planet Terror" for us, including a bloody, knife-wielding sequence featuring Wray (Freddy Rodriguez) that takes place in a hospital overrun with virus-infected Sickos. In the live-action take, Rodriguez wasn't holding knives, and no prop blood was used, even on the virus-infected victims that Wray disposes of. Post-CG, Wray is double-fisting knives and blood is abundant. Using CG in place of prop blood, Toader says, saved on set and costume cleanings when multiple takes were necessary. In one sequence Wray slashes a Sicko, causing blood to spurt. To simulate the spurting, Toader used a digital handheld to film milk blown from a straw, CGing the red in afterward.

Near Toader's office resides Chris Olivia, former lead artist at Digital Anvil. Olivia, who specializes in creating animatics to map out sequences, showed us a progression of animatics used to organize the dramatic fight sequence between Cherry Darling, Wray, and "Planet Terror's" other survivors and the virus-carrying army that Bruce Willis' Lt. Muldoon leads. Olivia also screened for us animatics he created for "Machete," the fake trailer Rodriguez shot that plays during "Grindhouse." In addition to stringing together sequences, animatics also give Troublemaker's production crews a good resource from which to build sets, design costumes, etc.

Brunet, who joined Troublemaker with "Spy Kids 2," says Troublemaker Digital did about 80% of "Sin City's" look and feel, with work involving "building CG background environments and rough composites for Robert to approve, along with animatics for action scenes." To pitch his vision of "Sin City" to Miller, who reportedly wasn't in favor of a film adaptation, Rodriguez and his digital effects crew created a version of "The Customer Is Always Right," the movie's opening scene. "That short project took three weeks from start to end," Brunet says. "It was later polished by Hybride [a post-production effects company], but we took that sequence very close to a final state early on in the production." Miller obviously approved.

In "Grindhouse," the crew's "damage" effect not only looks and feels authentic, it almost becomes another character. During one stretch in production, Brunet says artist Drew Dela Cruz had multiple versions of damage for "Planet Terror's" six reels on systems running Autodesk Flame, compositing and effects software. Brunet says Dela Cruz "basically conformed [matched Roberts' final edit] the project and kept the final edit with damage straight and organized. Had he not been able to continue, we would have had a tough time sorting through the multiple layers and edits."

Welcome To "Grindhouse"

Rodriguez and Tarantino have both stated future "Grindhouse" movies are a possibility, including from other directors. In March, Rodriguez gave a packed keynote address on the grindhouse culture at the SXSW Festival in Austin, Texas. Rodriguez and AMD also sponsored a "Grindhouse" trailers contest for inspiring grindhouse directors. The winning entry, "Hobo With A Shotgun," earned its filmmakers an AMD-powered notebook. If other new or established directors do take on a grindhouse project, it's likely they'll study the "damage" and other special effects creativity from Troublemaker Digital's crew—weird, cool vibes and all.

by Blaine Flamig

used as she shoots, and the clean stunt was blended and comped as he travels through the door. The gun and ace bandage are the only CG elements in this shot, along with CG smoke for better integration."

Because much of "Planet Terror" is live action, CGing the gun required not only precisely removing the gray sock, but also adding back in material, such as shadows, to match the look of the original live take. In comparison to creating entire backgrounds on computer for "Sin City," Toader says, working with Cherry's CG gun was much more difficult.

Although Troublemaker has completed increasingly more shots in-house with each of Rodriguez's films, it still must outsource some effects work to effects houses. The Orphanage, for example, worked on several "Planet Terror" sequences, including the exterior shots in the zombie-helicopter sequence. The real helicopter Rodriguez used to film interior shots with at Troublemaker only has the front end intact, and there are no blades. Beyond CGing in the helicopter's remaining exterior, the zombies who are mauled by the 'copter's blades are also CG.

THE HOMEBREW LAPTOP

Build Your Own Potent Portable

Computer aficionados have been building their own systems since the advent of the PC. Notebooks are different. Because they're small, with crowded interiors, building a notebook from scratch is hard to do correctly, even for the pros. The fact is that most vendors, including the big, recognizable names, don't build their own notebooks. They basically do what we're going to do in putting together our own notebook—take a barebones system and add parts to order.

Many companies that manufacture notebooks now offer, either directly or through resellers, barebones notebooks that allow you to install your own short list of components. It's not quite the same as building from the ground up, but you can get the same satisfaction and sense of pride you get from building a desktop PC. And you can take it with you.

Most parts of a notebook computer aren't replaceable, and the components that come with the system are what you will have to live with. Your barebones system will include a motherboard that dictates the range of CPUs that you can use, based on the socket and supporting chipset. The graphics system in most cases will be onboard and fixed, although you may be able to find systems that allow some flexibility. Asus recently announced the soon-to-be-released ASmobile C90S barebone system with an MXM slot that lets you choose your own MXM graphics module. Other manufacturers will no doubt follow suit in some fashion.

The display may be your most important consideration. Be sure about how you plan to use your notebook and get a system with a display to match that plan. If you're most interested in playing video games, get a system with a large, fast, high-resolution display that includes a dedicated graphics system. If you're going to use the notebook for watching movies on a regular basis, get a widescreen system. For a system intended to primarily run Microsoft Office apps, a lightweight case with a small screen and integrated graphics will work great (and probably save you some money).

The components you have some choice of are the CPU, memory, hard drive, optical drive, and Wi-Fi card. If you're a graphics artist or video editor, you need a powerful CPU, a lot of memory, and the biggest and fastest hard drive you can get, and your optical drive should include DVD burning capability. For better battery life, get the lowest-voltage components you can find without compromising your notebook's performance.

Shopping for your parts is as easy as turning on your current PC and surfing the Web. Some manufacturers of barebones notebooks are AOpen, Asus, Clevo, and MSI.

One very important consideration in buying a barebones notebook is that tech support may be very limited or even nonexistent. If you put your system together and it doesn't work, troubleshooting the problem could be difficult and lonely. Sure, the notebook will have a warranty, but the best the manufacturer may be able to do is ask you to return the system for them to check. Will you send your complete system or remove your added components (one of which may be the problem)?

Asus and MSI offer a one-year warranty for their barebones systems, but others might not. No matter who the manufacturer is, if you need tech support for your DIY notebook, things can be messy.

Building your own notebook might save you some coin, but it largely depends on the type of system you want to build. Good luck making an entry-level laptop for $500, but we found significant savings in building our own high-end gaming notebook. As we discovered in "Some Assembly Required" on page 50, you pay a lot for a boutique's name and warranty. When planning your budget, don't forget the cost of the OS and any other software you want to use.

If you can handle the few potential negatives, building your own notebook is a rewarding project. Your attachment to your computer will be greater than if you'd bought it off the shelf—in a healthy way, we think. Your friends and colleagues will be impressed that you assembled it yourself, and you don't have to tell them how easy it really is to do. ▲

by David Finck

50 PARTS & PARCEL
The Notebook Builder's Essential Shopping Guide
56 SOME ASSEMBLY REQUIRED
Tower Power In A Mobile Package
64 POWER USER ACCESSORIES
Give Your Notebook An Accessory Boost

PARTS & PARCEL

The Notebook Builder's Essential Shopping Guide

Farewell, Dell. Goodbye, Gateway. Adios, Acer. Sayonara, Sony. Of course, you're comfortable with building your own PC, but building your own notebook is an entirely different beast, right? Not anymore. Thanks to huge strides in mobile hardware from the likes of Intel, AMD, and Nvidia, the benefits of building your own PC (handpicking components, installing and configuring the software and OS of your choice, and the ability to swap and upgrade components at will) are now applicable to the world of notebooks.

By building your own notebook, you can get exactly what you want, and you can do it for a surprisingly affordable price, whether you're looking for a light-as-a-feather ultraportable, a thin-and-light productivity powerhouse, or a DTR (desktop replacement) that lets you game no matter where you happen to be. If you're a do-it-yourselfer on the go, then read on for the components you crave.

Barebone Shells

Z84Jp
$939
Asus
www.asus.com

The barebone shell is the foundation of your custom-built notebook. When you choose a barebone shell, you're also making a decision about the unit's screen size, resolution, chipset, graphics adapter, processor slot, memory slots, number of HDD and expansion bays, interface and audio ports, battery capacity, and overall size and weight. Consider your options carefully to avoid having to compromise later. The prices listed below are accurate at the time of this writing and based on those found at RK Computers (www.rkcomputer.net) and R&J Technology (www.rjtech.com) and may be subject to change.

If you want to assemble the notebook yourself, RK Computers and R&J Tech will let you. At R&J Tech.com, select the appropriate option during checkout. When shopping on RKComputer.net, just insert a note in the comments section to ship as parts. Both sites offer to assemble your notebook free of charge.

Asus Z84Jp

The Asus Z84Jp barebone shell is ideally suited for builders who want a DTR that won't hold them back. The unit features a glossy, black finish and a 17-inch WSXGA+ (1,680 x 1,050) LCD. Asus built the Z84Jp around Intel's 945PM and ICH7M chipset. You'll need to purchase the following separately: Intel Core Solo, Core Duo, or Core 2 Duo (Socket M) processor, up to 4GB of DDR2-667 memory (in two SODIMM sockets), and an Nvidia GeForce Go 7300, 7600, or 7700 discrete graphics adapter. If you want wireless, the Z84Jp is compatible with mini PCI-E modules, such as Intel's PRO wireless adapters. The case includes one 2.5-inch SATA HDD

Z35Fm
$745
Asus
www.asus.com

MS-1058
$719
MSI
www.msicomputer.com

MS-171614
$749
MSI
www.msicomputer.com

bay that supports 80, 100, 120, and 160GB drives at 5,400/7,200rpm speeds.

The unit ships with a DVD-RW optical drive, a 7-in-1 card reader, integrated 10/100/1000 LAN, a V.92 modem, Bluetooth, an ExpressCard slot, a VGA port, an S-Video port, four USB ports, one FireWire port, audio ports, SPDIF, four speakers and a subwoofer, a 6-cell battery, an integrated 2MP camera, an eSATA connector, and an HDMI connector. The Z84Jp also comes with an AC adapter, carrying case, and a one-year warranty.

Asus Z35Fm

The pearl white, ultraportable Z35Fm includes a high-glare 13.3-inch WXGA (1,280 x 800) LCD and a mainboard based on Intel's 945GM and ICH7M chipset. Graphics are handled by Intel's integrated GMA 950, which snags up to 224MB of system memory for graphically intensive tasks. Processor support includes Intel's Core 2 Duo, Core Duo, and Core Solo CPUs. The Z35Fm offers a 2.5-inch bay for PATA HDDs. The Z35Fm ships with 512MB of integrated system memory and a single 1GB-capable DDR2-667 slot for an additional 1GB.

Asus also threw in Wi-Fi courtesy of Intel's 3945 802.11a/b/g adapter, a DVD-RW optical drive, 10/100 Ethernet, a V.92 modem, integrated Bluetooth, two speakers, VGA port, S-Video port, three USB ports, one FireWire port, a 4-in-1 card reader, ExpressCard slot, 6-cell battery, AC adapter, carrying case, and a one-year warranty.

MSI MS-1058

If you're looking for an ultraportable platform, MSI's MS-1058 is a good choice. This barebone notebook comes in white or black and features a 12.1-inch WXGA LCD (1,280 x 800) and ATI's Radeon Xpress 1100 (RS485M and SB460) chipset. You can equip the MS-1058 with your choice of AMD Mobile Turion 64 and Turion 64 X2 processors and up to 2GB of DDR2-667 memory in the notebook's two SODIMM slots.

The MS-1058 relies on ATI's integrated graphics adapter and up to 128MB of system memory for video and 3D applications. The unit has a 2.5-inch PATA HDD bay for your choice of hard drive up to 120GB. The MS-1058 includes a DVD-RW optical drive, 802.11b/g Wi-Fi, Gigabit Ethernet, a V.92 modem, integrated Bluetooth, 4-in-1 card reader, ExpressCard slot, VGA port, three USB ports, one FireWire port, audio ports, AC adapter, and an 8-cell battery. The notebook also comes with five shortcut keys for power-on, email, Internet, wireless LAN, and personal settings. The barebone notebook includes a one-year warranty.

MSI MS-171614

On the Intel side, MSI offers the MS-171614 barebone notebook for system builders looking for a DTR. This unit includes a 17-inch WXGA (1,440 x 900) LCD and comes dressed in black. Based on the Intel 945GM and ICH7M chipset, the MS-171614 supports Intel's Core 2 Duo, Core Duo, and Solo CPUs, up to 2GB of DDR2-667 memory (in two SODIMM slots), and one 2.5-inch SATA HDD. Intel's GMA 950 handles the graphics processing by borrowing up to 224MB of system memory.

MSI also included a DVD-RW optical drive that reads and writes DVD RAM, a 4-in-1 card reader, four speakers and a subwoofer, Gigabit Ethernet, a V.92 modem, 6-cell battery, DVI port, S-Video port, audio ports, SPDIF port, three USB ports, ExpressCard slot, PC Card Type II slot, one FireWire port, an internal mini PCI-E slot for wireless adapters, an AC adapter, and a handful of buttons for power-on, email, Internet, wireless LAN, and camera/search functions. MSI provides a one-year warranty.

Clevo M590KE

The M590KE resides at the high end of Clevo's MobiNote series of barebone notebooks and makes a good mobile platform for gamers and graphics professionals. This silver-skinned DTR sports a massive 20.1-inch WSXGA+ (1,680 x 1,050) LCD. Nvidia's nForce4 SLI chipset provides the backbone and the 512MB GeForce Go 7950 GTX handles the graphics processing. The barebone notebook can also accommodate Nvidia's 512MB Quadro FX 2500M and a second of either card in SLI.

You can install an AMD Mobile Turion 64 X2 processor, up to 2GB of DDR2-667 memory (in two SODIMM slots), and up to two 2.5-inch SATA HDDs in a RAID 0

M590KE
$2,259
Clevo
www.clevo.com.tw

M621NC
$1,249
Clevo
www.clevo.com.tw

or 1 array. The M590KE includes a DVD-RW dual-layer optical drive, 802.11b/g Wi-Fi, Gigabit Ethernet, IR receiver, V.92 modem, a 12-cell battery, AC adapter, 7-in-1 card reader, four speakers and a subwoofer, microphone, SPDIF port, audio ports, five USB ports, one FireWire port, serial port, DVI port, PC Card Type II slot, carrying case, and a one-year warranty. Optional extras include a 1.3MP Web cam, TV tuner, and Bluetooth module.

Clevo M621NC

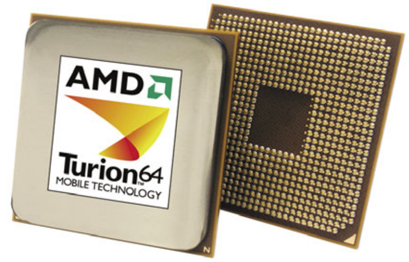
Clevo's ultraportable M621NC features a white shell and a 12.1-inch XGA (1,024 x 768) LCD. The M621NC is constructed around Intel's 945GM and ICH7M chipset. Clevo offers the barebone with either the 1.2GHz Core Solo U1400 or the 1.06GHz Celeron M 423 preinstalled. Like the Asus Z35Fm, the M621NC relies on Intel's GMA 950 and up to 224MB of system memory for graphics processing. The M621NC comes with 512MB of DDR2-533 memory integrated and a single SODIMM slot that lets you add another 1GB. The unit's HDD bay supports a single 2.5-inch or 1.8-inch PATA HDD.

The M621NC we priced comes with a DVD-RW drive, but you can configure it with a DVD-ROM or a DVD/CD-RW Combo drive instead. When purchasing this barebone notebook, you can add a Bluetooth module and an 802.11a/b/g Wi-Fi module. The base model comes with a fingerprint reader, PC Card Type II slot, VGA port, 10/100 Ethernet, V.92 modem, AC adapter, 4-cell battery, two built-in speakers, audio ports, 4-in-1 card reader, three USB ports, one FireWire port, a carrying case, and a one-year warranty.

CPUs

The current lineup of mobile processors from Intel and AMD let you get more done with significantly less power than was possible just a couple of years ago. Intel and AMD offer a range of mobile processors in dual- and single-core varieties.

AMD's Mobile CPUs



As we went to press, AMD's Mobile Sempron and Mobile Athlon 64 processors were in short supply, leaving AMD notebook builders not much to choose from but the single- and dual-core Turion 64 CPUs. But these processors generally consume less than half the power of Mobile Athlon 64s at comparable clock speeds. And AMD's Turion 64 X2 dual-core processors can really improve your multitasking experience while on the road.

The AMD mobile processors below support AMD's battery-boosting PowerNow! Technology, work in 32- and 64-bit operating environments, feature a 1,600MHz HyperTransport bus, and utilize an integrated memory controller. As we went to press, AMD had not completed its transition to the 65nm process, and the CPUs available were all manufactured using a 90nm process.

AMD Turion 64 MT-37

For the budget builder, we recommend the AMD Turion 64 MT-37, which sports a 2GHz core clock and 1MB of L2 cache. This processor features a 754-pin socket and a paltry 25W TDP (Thermal Design Power), which translates to extra battery life. Due to the integrated memory controller, AMD's Socket 754 mobile processors are only compatible with 144-pin DDR memory.

Turion 64 MT-37
$170 (www.newegg.com)
AMD
www.amd.com

AMD Turion 64 X2 TL-56

The AMD Turion 64 X2 TL-56 is a good mid-range, dual-core, mobile processor. Each of the TL-56's execution cores is clocked at 1.8GHz and has 512KB of L2 cache to work with, for a total of 1MB of L2 cache. The TL-56 is compatible with barebone notebooks that support Socket S1 CPUs and DDR2 SODIMM memory. The second core contributes to the CPU's slightly more significant 33W TDP.

Turion 64 X2 TL-56
$240 (www.newegg.com)
AMD
www.amd.com

AMD Turion 64 X2 TL-60

AMD's Turion 64 X2 TL-60 features two execution cores, each clocked at 2GHz. Each core also has 512KB of L2 cache for a total of 1MB. Because the TL-60 uses AMD's Socket S1 and an updated memory controller, you'll be able to pair it with faster 200-pin DDR2 memory. This processor has a 35W TDP.

Turion 64 X2 TL-60
$315 (www.avadirect.com)
AMD
www.amd.com

Intel's mobile CPUs

Compared to AMD, Intel's entire catalogue of mobile processors was readily available. As we went to press, most online shops offered a wide range of Core Solo, Core Duo (Yonah), and Core 2 Duo (Merom) processors. We also found a smattering of Celeron M and Pentium M processors for sale. For an Intel-based notebook, you can't go wrong with Core Solo, Core Duo, and Core 2 Duo processors. Intel's mobile Core processors are all Centrino-capable and feature Intel's enhanced SpeedStep technology, which lets the system throttle down the CPU's clock speed and voltage to conserve battery life. Unlike AMD's processors, Intel leaves the memory controller to the chipset, so DDR2 memory is compatible with each processor below. These CPUs have a 667MHz FSB, use the 478-pin Socket M interface, and were built using the 65nm manufacturing process.

Intel Core Solo T1300

If you're looking to build an affordable portable, Intel's 1.66GHz Core Solo T1300 offers decent performance for not a lot of cash. The T1300 is a Yonah processor that features 2MB of L2 cache and a TDP rated at a maximum of 27W. You can only use the T1300 with 32-bit software and operating systems, however.

Core Solo T1300
$149 (www.directron.com)
Intel
www.intel.com

Intel Core Duo T2400

The Core Duo T2400 is a dual-core processor that offers two execution cores clocked at 1.83GHz each. The T2400's 2MB of L2 cache is shared between the two cores. Like the Core Solo T1300, this processor doesn't support 64-bit operating environments. The T2400 has a TDP of 31W.

Core Duo T2400
$239 (www.newegg.com)
Intel
www.intel.com

Intel Core 2 Duo T7200

Intel's Core 2 Duo T7200 is a Merom CPU that offers Intel's x86-64 implementation for running in 32-bit or 64-bit operating environments. Both cores have a 2GHz clock, a total of 4MB of shared L2 cache, and a TDP of 34W.

Core 2 Duo T7200
$299 (www.newegg.com)
Intel
www.intel.com

Mobile GPU

As stated above, your choice in mobile graphics depends largely on the barebone notebook you choose. Integrated graphics adapters available from Intel and AMD offer excellent 2D performance. 3D performance on these chips is limited because they typically lack dedicated memory and borrow system memory for video processing. An integrated graphics adapter will struggle to display modern games at high resolutions and playable frame rates, but they're much more power-efficient than discrete mobile graphics adapters.

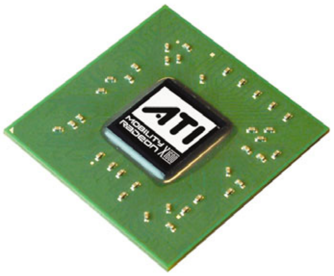
But if you want your 3D to go, then you need to go discrete. Upgrading a notebook's graphics adapter isn't the impossible task it once was thanks to Nvidia's MXM (Mobile PCI Express Module) and ATI's AXIOM (Advanced Express I/O Module) platforms. MXM- and AXIOM-based graphics adapters feature a platform-specific connector and standard form factors to make it easier for resellers (and you) to plug in the adapter of your choice.

Intel

The first generation of Intel's Graphics Media Accelerator, GMA 900, could be found on Intel's 910GML, 915GMS, and 915GM Express chipsets. GMA 900 used up to 128MB of system memory for video processing and had a 333MHz core clock. Intel's updated GMA 950, available on 945G chipsets, has a 400MHz clock and allocates up to 224MB of system memory for graphics-intensive tasks.

ATI

The Mobility Radeon X1K series of graphics adapters, based on ATI's R520 architecture, are capable of running full-screen anti-aliasing, HDR (High Dynamic Range), anisotropic filtering. Other features include Avivo video technology, Shader Model 3.0 support, Parallax Occlusion Mapping, Volumetric Lighting, Dynamic Soft Shadows, and ATI's battery-saving PowerPlay technology. Hardcore gamers and graphics professionals can also configure high-end notebooks with ATI's CrossFire. Individual prices were unavailable because the graphics adapters below were sold along with the barebone notebook. As we went to press, ATI had just launched the Windows Vista-ready Mobility Radeon X1900 and X2300, designed for DTRs and thin-and-light notebooks, respectively.



Mobility Radeon X1600

Designed for thin-and-light notebooks, the Mobility Radeon X1600 can be configured with 128MB or 256MB of dedicated video GDDR3 memory and a core clock of between 445 and 470MHz, depending on the notebook in which it appears. This unit features a 128-bit memory interface, 12 pixel shader pipelines, and five vertex processors. You can achieve decent frame rates using this card in modern games.

Mobility Radeon X1800 XT

This graphics adapter is ideal for mobile users who want a desktop-class gaming and viewing experience in a notebook form factor. The enthusiast-class Mobility Radeon X1800XT includes up to 256MB of GDDR3 memory, 16 pixel shader pipelines, eight vertex processors, and a 550MHz core clock.

Mobility Radeon X2300

A relatively new addition to AMD's family of mobile Radeon GPUs, the Mobility Radeon X2300 might be meant for thin-and-light notebooks, but it has up to 128MB of dedicated memory at its disposal and can leech more from your system via HyperMemory technology. Avivo and ATI PowerPlay are also included.

Nvidia

Nvidia's GeForce Go 7 series of mobile graphics cards support Shader Model 3.0, HDR, and Nvidia's PureVideo technology, which brings high-quality video playback to your notebook. These mobile graphics adapters feature Nvidia's PowerMizer technology, which is designed to improve the notebook's battery life. Nvidia doesn't leave the enthusiast out in the cold, either: You can equip many DTR notebook shells with two SLI-capable GeForce Go 7 series graphics adapters.

GeForce Go 7400

Designed for thin-and-light notebooks, the GeForce Go 7400 features a 64-bit memory interface and either 128MB or 256MB of GDDR2 memory (depending on the configuration). The GeForce Go 7400 also features four pixel shader pipelines and three vertex processors. Nvidia's exclusive TurboCache technology enables the GeForce Go 7400 to allocate system memory to video processing tasks when necessary.

GeForce Go 7950 GTX

This enthusiast mobile graphics adapter comes with up to 512MB of dedicated 700MHz GDDR3 memory, a 256-bit memory interface, and a 575MHz core clock (core and memory clock may vary depending on notebook). Nvidia equipped the GeForce Go 7950 GTX with 24 pixel shader pipelines and eight vertex processors. This unit offers transparency antialiasing and supports XHD (Extreme High Definition—high-resolution widescreen gaming and video).

RAM

Shopping for notebook RAM isn't very different from shopping for desktop RAM. You'll need to determine how many memory slots your notebook has, what speeds your notebook can handle, whether those slots accommodate DDR or DDR2 memory, and whether you'll need 144- or 200-pin modules. And because notebook RAM is the most frequently-upgraded component on notebooks, most online component retailers offer it.

Kingston KVR133X64SC3L/512

Kingston's 512MB SODIMM PC133 module is ideal for running Windows XP in thin-and-light notebooks. This low-profile, 144-pin module is unbuffered, non-ECC memory that has a CAS latency of 3 and a 3.3V power requirement.

KVR133X64SC3L/512
$88 (www.newegg.com)
Kingston
www.kingston.com

Corsair VS1GSDS400

1GB of system memory is enough to power Vista or WinXP and still let you multitask and serve up media without slowing you down. Corsair's ValueSelect 1GB SODIMM PC3200 module is unbuffered, non-ECC memory that operates at 2.6V and features a 200-pin interface.

VS1GSDS400
$100 (www.newegg.com)
Corsair
www.corsairmicro.com

Corsair VS2GSDSKIT667D2

If you want to do any audio or video editing or gaming and have two memory slots, we recommend Corsair's 2GB ValueSelect DDR2 SODIMM PC2-5300 kit. This pair of matched 1GB modules features a 200-pin interface and support for dual-channel mode.

VS2GSDSKIT667D2
$129 (www.zipzoomfly.com)
Corsair
www.corsairmicro.com

HDD

The hard drive you choose for your notebook will need to be able to hold everything you want to access from the road. If you're building a DTR, you'll typically need as much storage as you can afford. If you're building a thin-and-light, capacity may be less important. The speed of your notebook HDD will also directly impact your day-to-day mobile experience, so balance price and performance for the best fit. (Prices obtained at www.newegg.com.)

Samsung Spinpoint MP0603H

If you only plan to use your notebook when you're away from your desktop, then Samsung's Spinpoint MP0603H is an affordable 60GB option. This hard drive has a 5,400rpm rotational speed, 8MB cache, an ATA-6 interface, and a 2.5-inch form factor. The MP0603H also includes Samsung's noise-reducing SilentSeek technology.

Spinpoint MP0603H
$50
Samsung
www.samsung.com

Western Digital Scorpio WD1600BEVS

Your DTR won't get far with a puny hard drive. Western Digital's Scorpio

WD1600BEVS is a 160GB hard drive with a 5,400rpm rotational speed. This 2.5-inch HDD also has an 8MB cache and a SATA 150 interface. The WD1600BEVS also features WhisperDrive and SoftSeek technology to limit noise output regardless of spin speed.

Scorpio WD1600BEVS
$105
Western Digital
www.wdc.com

Optical Drive

Often, barebone notebooks ship with an optical drive. If you opt for a barebone without an optical drive or would like to upgrade, make sure to purchase a model that is compatible with your notebook. If your barebone notebook's documentation doesn't specifically state otherwise, any slim IDE optical drive designed for notebooks should work.

Sony CRX880A

Sony's CRX880A DVD-ROM/CD-RW combo drive is an affordable option for thin-and-light notebooks. This slim drive features an 8X DVD and 24X CD-ROM read speed and a 24X CD-R/RW write speed. The 5-inch drive sports an IDE interface.

CRX880A
$43 (www.directron.com)
Sony
www.sony.com

NEC AD-5540A

No desktop replacement notebook is complete without a DVD-RW drive. The AD-5540A is a slim CD/DVD burner that offers an 8X DVD+RW, 6X DVD-RW, 4X DVD±R DL write speed and an 8X DVD-ROM read speed.

by Andrew Leibman

AD-5540A
$66
NEC
www.nec.com

Shopping For DIY Notebook Parts

Now that you've caught the DIY notebook bug, it's time for a reality check: Notebook components aren't as widely available as desktop components. With a few exceptions, notebook parts aren't even available in retail packages, which means you'll have to get most of them as OEM parts sans installation instructions, cables, screws, and pretty boxes. In some rare cases, these OEM parts even ship with reduced warranties and limited or no support.

The good news is that there are a handful of reputable resellers that offer all the parts and support a DIY notebook builder needs. Read on for our list of preferred notebook parts peddlers.

Directron

Houston-based Directron (www.directron.com) has been selling computer components for more than a decade and offers live phone support during business hours (9 a.m. to 5 p.m. CST, M-F; 11 a.m. to 4 p.m. Saturdays) and a toll-free phone number after you've placed your first order.

- Price: Several items are priced at or below the prices offered at other resellers
- Selection: Seven barebone notebook models in stock, dozens of mobile CPUs, a wide selection of DDR and DDR2 SODIMM modules, a range of PATA and SATA HDDs, a variety of proprietary and third-party optical and floppy drives, and three Intel wireless mini PCI modules
- Shipping Options: UPS, USPS, FedEx, and free onsite pickup
- Return Policy: All unopened components except CPUs and memory may be returned within 30 days for a refund. CPU and memory can only be returned within seven days for a refund. Restocking fees may apply based on item returned and reason for returning.
- ResellerRating: 8.35

AVADirect

Based out of Cleveland, Ohio, AVADirect (www.avadirect.com) has been selling custom PCs, notebooks, and parts since 1999. AVADirect also offers toll-free technical, sales, and customer support 8:30 a.m. to 5 p.m. Monday through Friday (CST).

- Price: Several items are priced at or below the prices offered at other resellers.
- Selection: Dozens of barebone notebook models, CPUs, DDR and DDR2 SODIMM modules in stock, more than 50 SATA and PATA HDDs, several proprietary and third-party optical drives, and five mini PCI wireless modules from Intel and MSI.
- Shipping Options: UPS, USPS, and free onsite pickup
- Return Policy: At AVADirect's discretion, all unopened components may be returned within 30 days for a refund. A 15% restocking fee may apply.
- ResellerRating: 9.49

R & J Technology

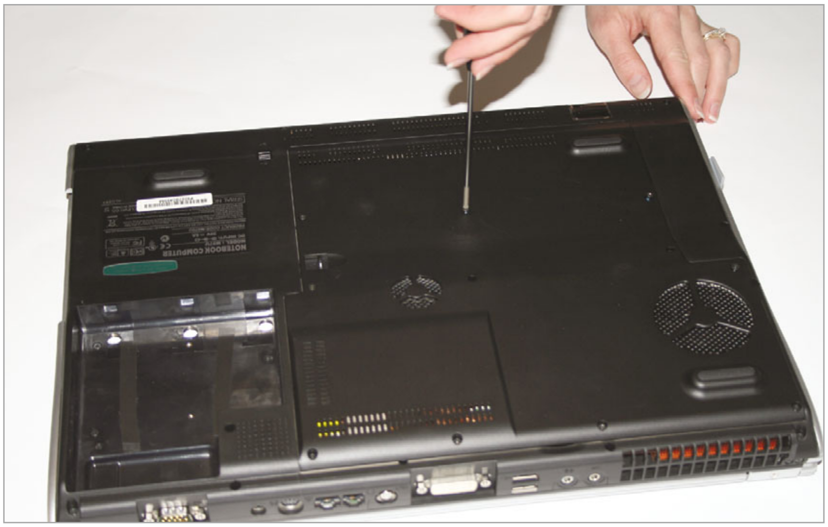
R & J Technology has been selling mail-order computers and components from Diamond Bar, Calif., since 1995. R & J Technology gives you the option to install the parts yourself or let R & J Technology do it for you for free. You can call the toll-free phone number for sales or customer support 10 a.m. to 7 p.m. Monday thru Friday (CST).

- Price: Several items are priced at or below the prices offered at other resellers, and price matching is available.
- Selection: Offers a range of barebones systems from Asus, Clevo, MSI, and Compal. You can choose compatible parts from the barebone notebook page or browse the Notebook Hard Drive, Memory, and Optical Drive links to purchase individual components.
- Shipping Options: UPS and USPS. Some items are eligible for free shipping within the continental US.
- Return Policy: Some items cannot be returned for credit or refund at R & J Technology's discretion. Defective items must be returned within 15 days of purchase. A 15% restocking fee may apply.
- ResellerRating: 9.44

SOME ASSEMBLY REQUIRED

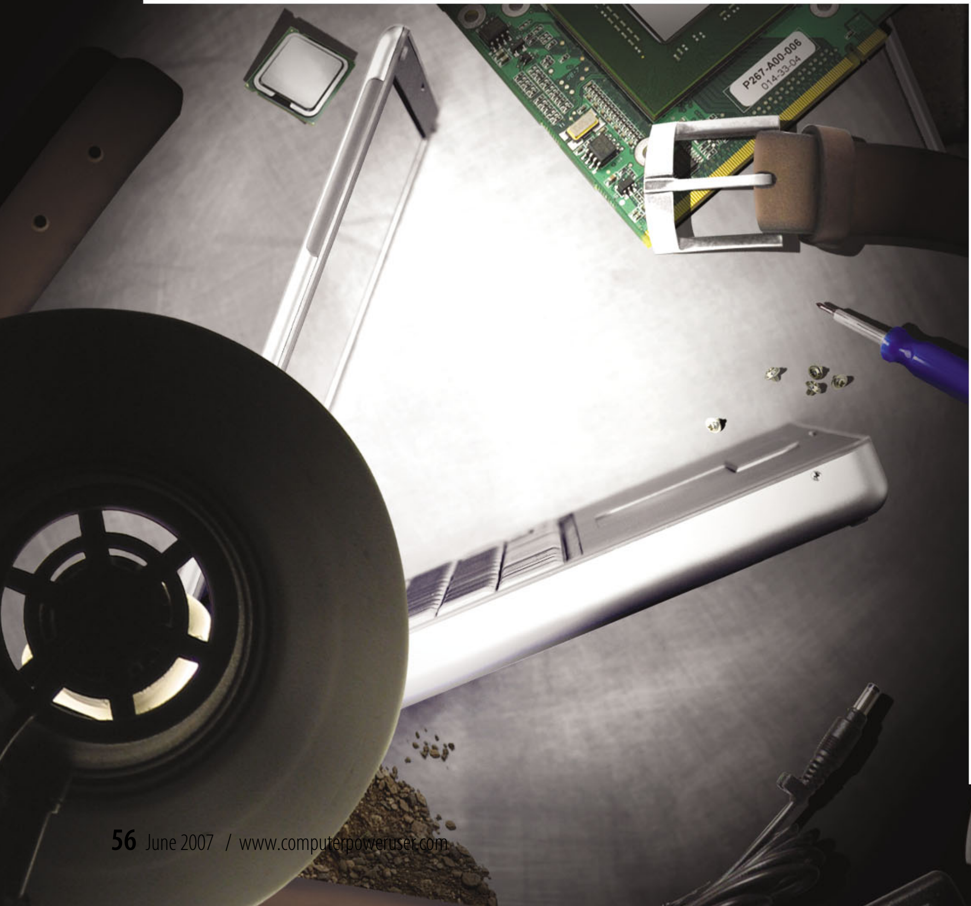
Tower Power In A Mobile Package

You've built numerous PCs, a server, and tweaked countless settings along the way. Now you're thinking, "What's left to do?" If you're looking for a new project, consider making your next build a powerhouse of smaller proportions. By building your own notebook, you can get a powerful system and control many facets of the design.



When you're ready to begin building your notebook, grab your screwdriver and remove the back casing.

You already know the satisfaction and enjoyment that comes from assembling components to form a powerful desktop. If you're looking for mobility but don't want to give up any of the customization inherent in building your own machine, you'll be well served by building your own laptop. When you install all of the components, you know exactly what you're getting, and it'll be easier to upgrade the notebook in the future.



In addition to getting a quality notebook, you can save some money by building a high-end system. In fact, when we configured a VoodooPC envy u:734 with similar specifications as the notebook we built, the grand total was slightly over $4,382. By comparison, all of our parts cost around $2,952. That's over $1,400 in savings, plus the fun of building the notebook yourself.

On the other hand, you don't have the safety net of an OEM warranty if something goes wrong with your build. And although building a high-end system saved us money, you'll likely find the amount you'd save declines if you opt for a less expensive build.

If you have an old notebook that doesn't work, you might think about reusing some of its components (such as the optical drive) to save some cash. If you pair a good barebook with some of the "old" but still functional components, you might be surprised at what you can build for a reasonable price.

For the technically inclined, assembling a DIY notebook isn't terribly challenging, even if the barebook manufacturer didn't include much documentation. In fact, if you've put together a desktop or two, you may find that assembling a notebook is comparable in difficulty. Today's barebooks come with a case, display, and motherboard preinstalled; all you have to do is add a few additional components, such as a processor, hard drive, optical drive, and memory.

Tricked Out

The first step in building a notebook is to figure out what type of notebook you want to build. This may seem obvious at first, but take a few minutes to list your intended uses for the machine. It will help you make intelligent buying decisions later. For this article, we focused on performance for gaming and other intensive applications. If you won't be using the machine to play games, you can focus your budget on the components you find important. Once you've nailed down what you'll need from your notebook, you will want to spend some time shopping around for components. In "Parts & Parcel" on page 50, you'll find a good overview of what's out there, along with a few stores that are worth checking out.

Your barebook should come with the necessary screws and cables, but it never hurts to double-check. Also, don't forget the thermal paste when shopping if you don't already have some lying around from a previous build.

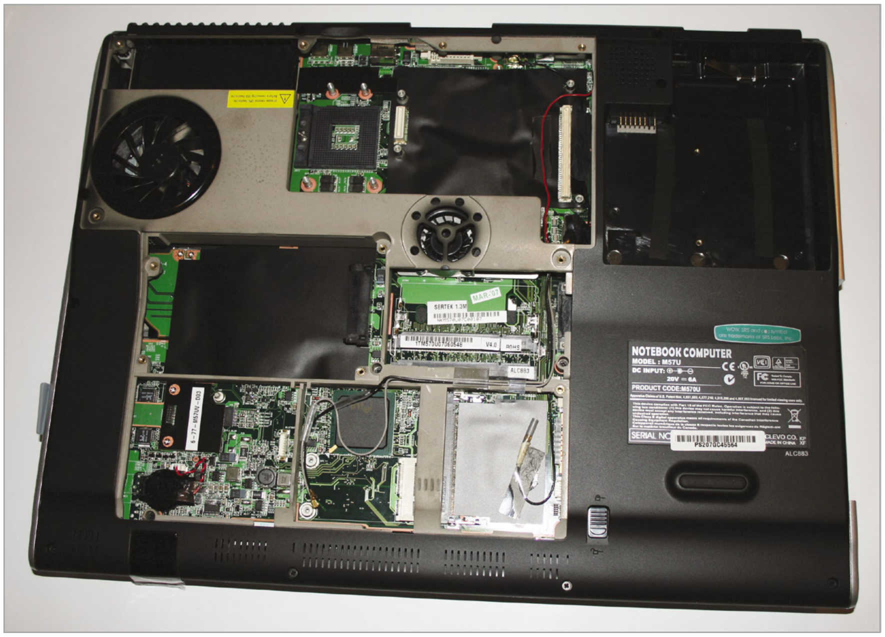
The Parts

For this build, we chose the Clevo M570U barebook. If this case looks familiar, it's probably because Alienware, VoodooPC, and other manufacturers have used the same case for some of their notebooks. Although some of these manufacturers may give you the option to personalize the case with a custom paint job, the Clevo comes with a silver, black, and charcoal finish. Clevo put us in contact with ProStar (www.pro-star.com) for our barebook; a number of online retailers also carry it.

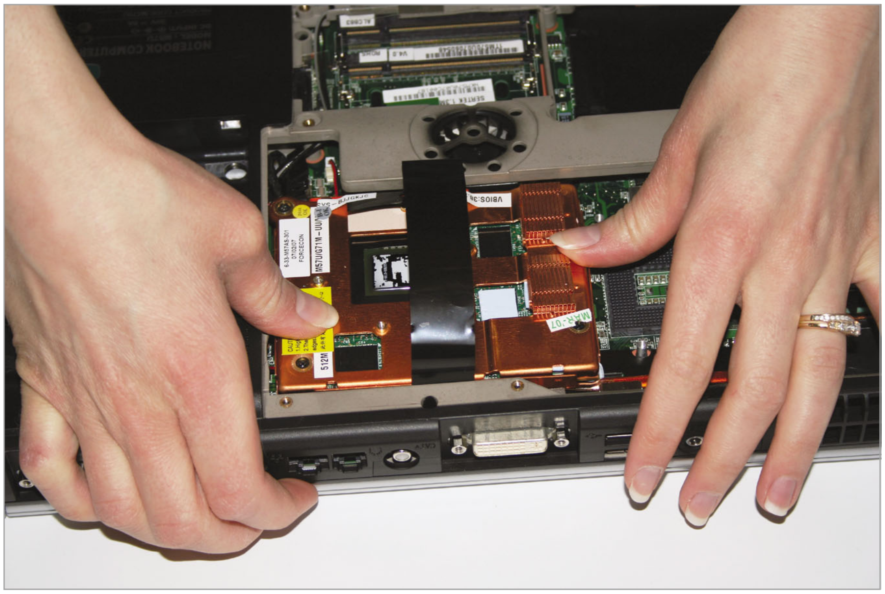
The M570U has a full-sized keyboard with a numeric pad, built-in microphone, 1.3MP video camera, and a 7-in-1 card reader. You'll also find four USB 2.0 ports, a mini IEEE1394a port, TV-out and DVI ports, Gigabit Ethernet, an internal modem, and an Express card slot. On the front of the M570U, there's a small LCD and controls for the CD drive that are accessible even when the notebook is closed. With these controls, you can play CDs without booting Windows.

The built-in audio system on the Clevo M570U is impressive. This barebook comes with two built-in speakers and a subwoofer that is located on the underside of the notebook. The audio quality is good, even when the notebook is closed. The M570U supports 7.1-channel audio output. It also supports the SRS WOW surround system.

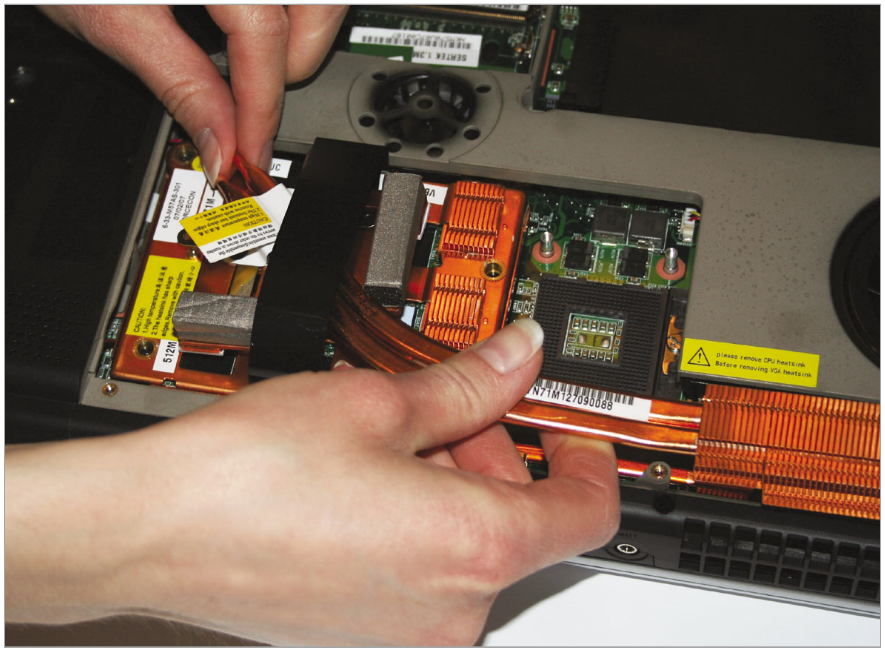
The M570U is available with a few 17-inch screen options. We picked the WUXGA (1,920 x 1,200) GlassView



The Clevo M570U may look empty now, but soon it will be a working machine.



Gently push the video card into the appropriate sockets and use the screws to secure it in place.



Getting the GPU heatsink into the right position can be tricky. After putting a dab of thermal compound on the center of your GPU, twist and slide the heatsink until the screw holes line up.

Glossy display and opted for the Nvidia GeForce Go 7950 GTX with 512MB of video RAM. Designed for gaming and performance, this GPU has CineFX 4.0 and Subsurface Scattering that gives realistic color to skin and surfaces, and provides the same translucence as you would see when an object is placed in front of an intense light. HDR (High Dynamic Range) capabilities in this GPU make your games feel more realistic by displaying lifelike lighting and shadows. With HDR, your games can use the full brightness capabilities of your monitor to display scenes such as the glint of light on the metal blade of your sword. Additionally, transparency supersampling makes sure you won't miss any fine details.

You have your choice of quite a few Intel Core Duo and Core 2 Duo processors with the Clevo M570U; we opted for the top-of-the-line Intel Core 2 Duo T7600 processor that runs at 2.33GHz. If you're looking to cut costs without losing a lot of performance, you could save about $225 by going with the Core 2 Duo T7400 that runs at 2.16GHz and has the same 4MB L2 cache. If you really want to cut costs in the short term and plan to upgrade later, you could save about $450 and drop all the way back to the Intel Core Duo T2300 that runs at 1.66GHz. All of these compatible processors run on Intel's 945 chipset family.

For memory, there aren't as many high-performance memory choices available for notebooks as there are desktops, so we relied on a pair of 1GB DDR2-667 modules from a manufacturer we trust: Corsair. The notebook will actually support 4GB, but only 3GB is available to the OS.

To store all of our files, we selected Seagate's new Momentus 7200.2 ST9160823ASG 160GB hard drive with the optional G-Force Protection drop sensor. This drive runs at 7,200rpm and has a 3Gbps SATA interface. Available in capacities ranging from 80GB to 160GB, the Momentus 7200.2 line combines perpendicular recording with an optional free-fall sensor to help protect against damage and data loss from drops. Seagate says this second-generation notebook drive is lean on power consumption and doesn't make a lot of noise because it uses SoftSonic fluid-dynamic bearing motors and QuietStep ramp load technology. We'd agree that the drive is quiet: While using our notebook, we hardly noticed any sound from the drive.

Because we're holding out for a more impressive lineup of next-gen BD (Blu-ray Disc) and HD DVD drives, we put an 8X Pioneer DVD±RW Dual Layer optical drive in our notebook. If you don't need an optical drive, you can opt for a second battery or hard drive.

Parts & Prices

Every barebook and build will require different components. Although notebook components aren't quite as plentiful as desktop components, you should be able to find a number of parts from the likes of NewEgg (www.newegg.com), Buy.com, and other online retailers. R&J Technology (www.rjtech.com) sells a variety of barebooks from MSI, Clevo, Asus, and other manufacturers. It also gives you the option to buy a complete package with the compatible components of your choosing.

Here's a quick rundown of the parts and approximate prices for the components we used in our notebook. Tweak as necessary to suit your needs, style, and budget. ▲

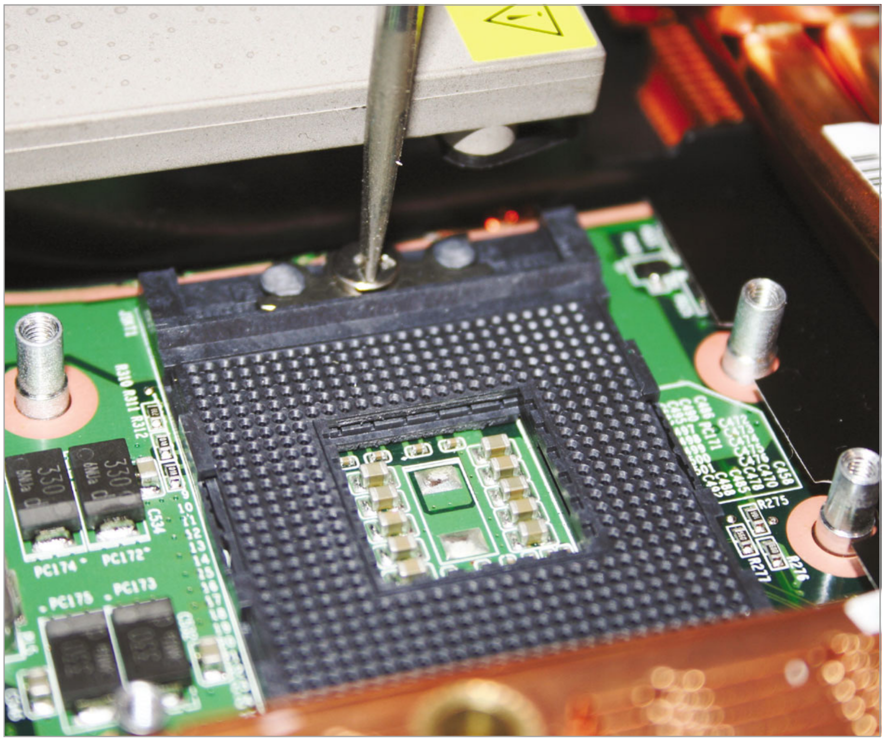
Barebook	Clevo M570U with 17-inch WUXGA (1,920 x 1,200) Super-Wide GlassView Glossy Surface and Nvidia GeForce Go 7950 GTX 512MB	$1,670
Processor	Intel Core 2 Duo T7600 2.33GHz Socket M	$640
RAM	CORSAIR ValueSelect 2GB (2x 1GB) DDR2-667 Dual Channel	$131
Optical drive	Pioneer DVR-K16RS 8X DVD±RW Dual Layer	$88
Hard drive	Seagate Momentus 7200.2 ST9160823ASG 160GB	$188
Wireless connectivity	Intel 3945ABG 802.11a/b/g + Bluetooth	$95
Operating system	Windows XP Professional (OEM)	$140
	Total cost:	**$2,952**

We topped off the machine with an Intel 3945ABG 802.11a/b/g + Bluetooth wireless card. The motherboard already has an integrated modem and Gigabit Ethernet, so we have a variety of connectivity options.

Take Action

Although the exact build for each barebook will vary, the general concept will remain the same. If your barebook shipped with the battery installed, remove it before installing any of the components. Then, grab your screwdriver and remove the back casing. Make sure to keep the screws in a safe place so that they don't roll away. (These tiny screws have a tendency to grow legs.)

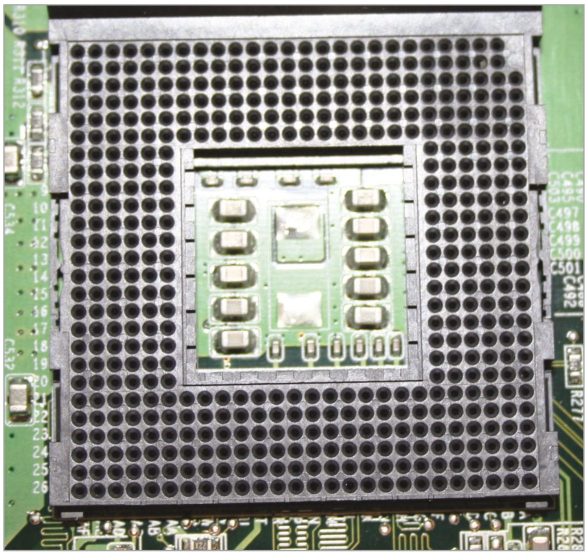
Even though our barebook came with the GPU preinstalled, we yanked it out in order to show the full build process. If your barebook comes with the GPU installed, you can skip these GPU installation steps. Because of its position in relation to other components, we installed the GPU for our Clevo M570U barebook first. We gently pushed the video card into the appropriate slots and tightened the screws. Then we put a dab of thermal compound on the center of the GPU and placed the heatsink on top of the GPU. It took some patience and delicate maneuvering to set the GPU heatsink in the right place: We had to slide and twist the heatsink at different angles in order to position it in the correct location. Once we had the heatsink in place, we fastened the screws using the order denoted on the heatsink.

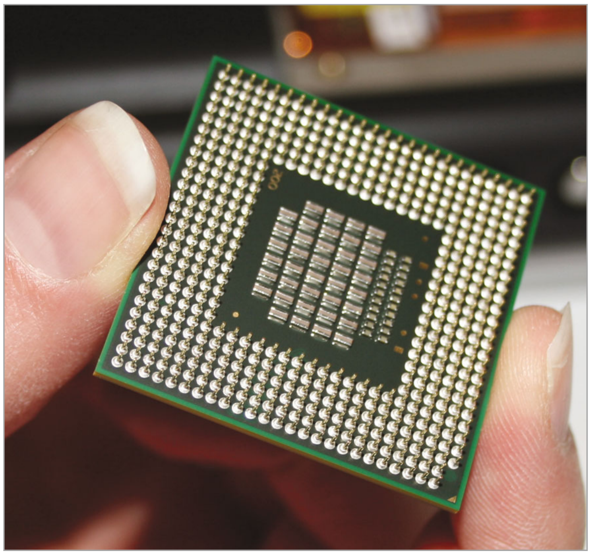


Examine the processor's socket to determine how it opens and closes. We turned the screw counterclockwise to open this socket.

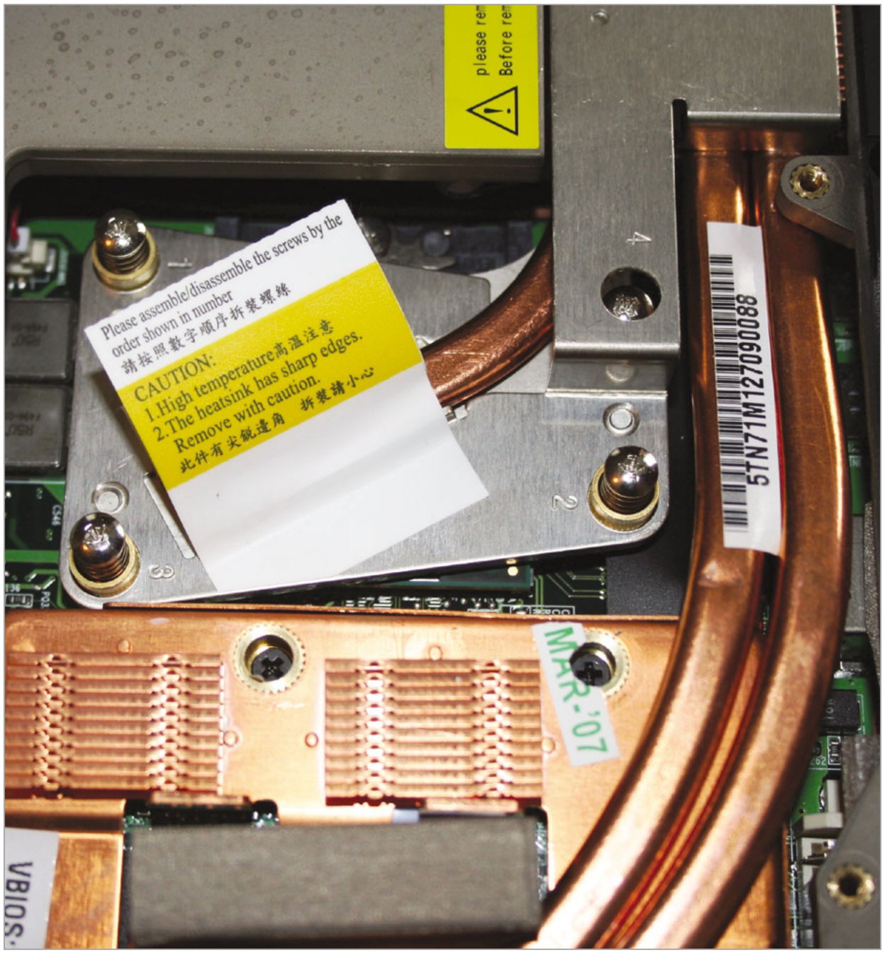
Each barebook should have its own CPU heatsink that suits the dimensions of the notebook and position of the processor. The processor's heatsink for our barebook came packaged separately. If the CPU heatsink that accompanies your barebook is already installed in the case, you'll need to remove it before you can install the processor.

The Clevo M570U has a fan positioned to the side of the processor that is directed towards the heatsink. This makes installation easy because you don't have to





After opening the socket, match the pins on the processor to the socket and set the processor in place.


please rem
Before rem
Please assemble/disassemble the screws by the order shown in number
CAUTION:
1.High temperature
2.The heatsink has sharp edges.
Remove with caution.
5TN71M127090088
MAR.'07
VBIOS.

Twist and turn the processor's heatsink until it's in position over the CPU and use the included screws to fasten it in place, following the order shown on the heatsink.

mess with uninstalling, reinstalling, or connecting the CPU fan while building.

To install the processor, first take a close look at its socket. Look for a small screw on the socket that says Close on one side and Open on the other. Turn the screw so the socket is in the Open position and insert the processor, paying close attention to line up the CPU pins with the socket's holes. Don't force it; the processor should easily drop into place. If it doesn't, check the position of the pins and retry. Once the processor is in, turn the screw to lock the processor in the socket.

If the heatsink for your CPU comes with a thermal pad, you may want to remove it, thoroughly clean the heatsink with rubbing alcohol or a special thermal paste remover, and apply a higher-quality thermal compound, such as Artic Silver 5. Put a small dab of thermal compound on the CPU and then position the heatsink. Here again, you may need to twist or turn the heatsink into position. Use the provided screws and follow the order etched into the heatsink to secure it. By following the order shown on the heatsink, you'll apply even pressure across the processor's integrated heat spreader.

Leave the hard drive and other components in their antistatic packaging until you're ready to install them. To install the

Build Tips 101

Whether you've built PCs before or if you're a newbie, there are a few things to keep in mind before and during your build. As with any project, it's important to have a proper work environment, take precautionary steps for safety (you wouldn't want to damage your fancy new hardware), and have the right tools at hand. Here's a quick rundown of some things to keep in mind while building.

Sprawl out. Give yourself plenty of room to work. Spread out and avoid distractions. Also, make sure your work environment has adequate lighting.

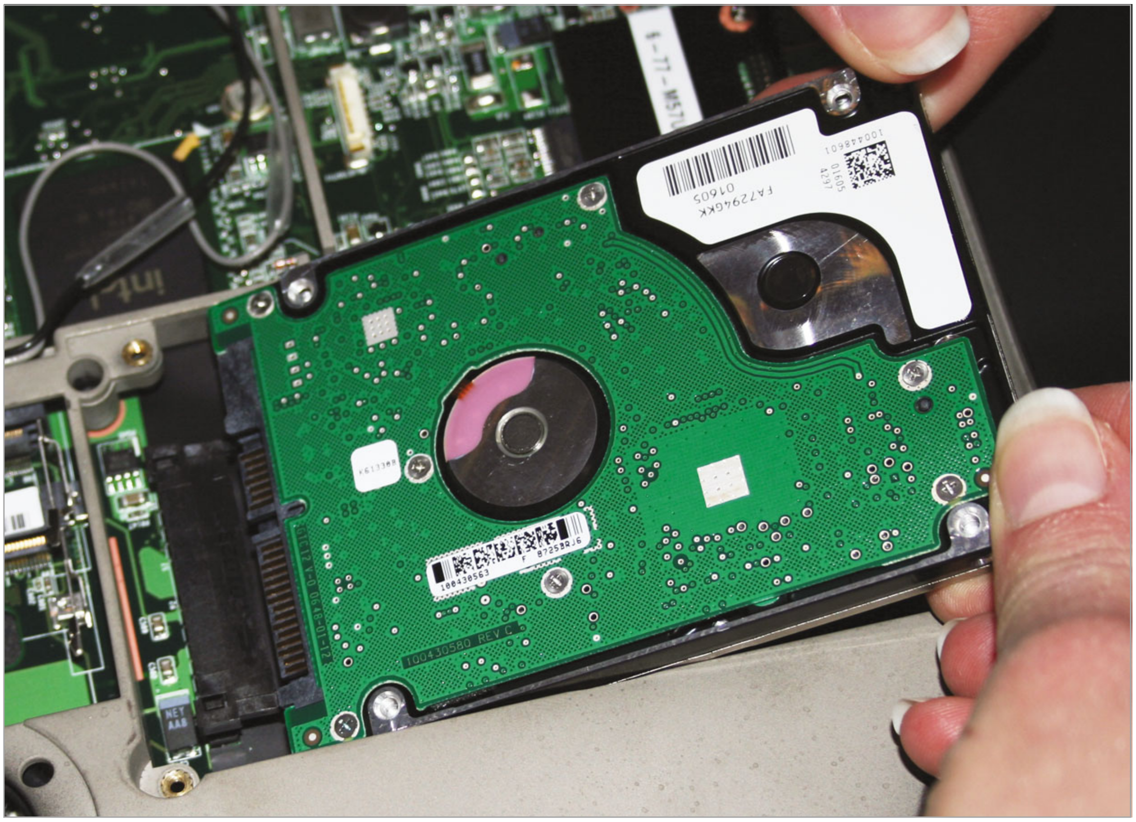
Beware of static. Static electricity and shiny new computer components don't mix. To protect your components from irreparable damage, make sure to ground yourself while working. The best approach is to wear an antistatic wrist strap while handling your components, but touching a grounded piece of metal first also works. It's also a good idea to avoid working on a carpeted floor.

Handy tools. To assemble the notebook, you won't need many tools. You will need a Phillips and a flathead screwdriver that fits the screw sizes of the components and case. If you've ever cracked open the case of your desktop, you likely have these screwdrivers lying around.

Time. Although the actual build shouldn't take a lot of time, it never hurts to allow for more time than you think you'll need. If you run into glitches, you won't be left with a bunch of parts lying around for another day. Also, unlike an off-the-shelf notebook, you'll need to install the operating system, drivers, and any other software from scratch, which takes time. Assuming everything goes well and you've allotted yourself extra time, you can use this time for gaming as a bonus to bask in the success of a job well done.

All or nothing. Don't start building without all of your components. With small components and even smaller screws, it's too easy to misplace a screw while waiting on the next component to arrive. We know waiting is painful, but it's not like you can use the system without all of the components anyway, so be patient. That said, when it comes time to build, pay particular attention to screw locations so that you can put them back where they belong later.

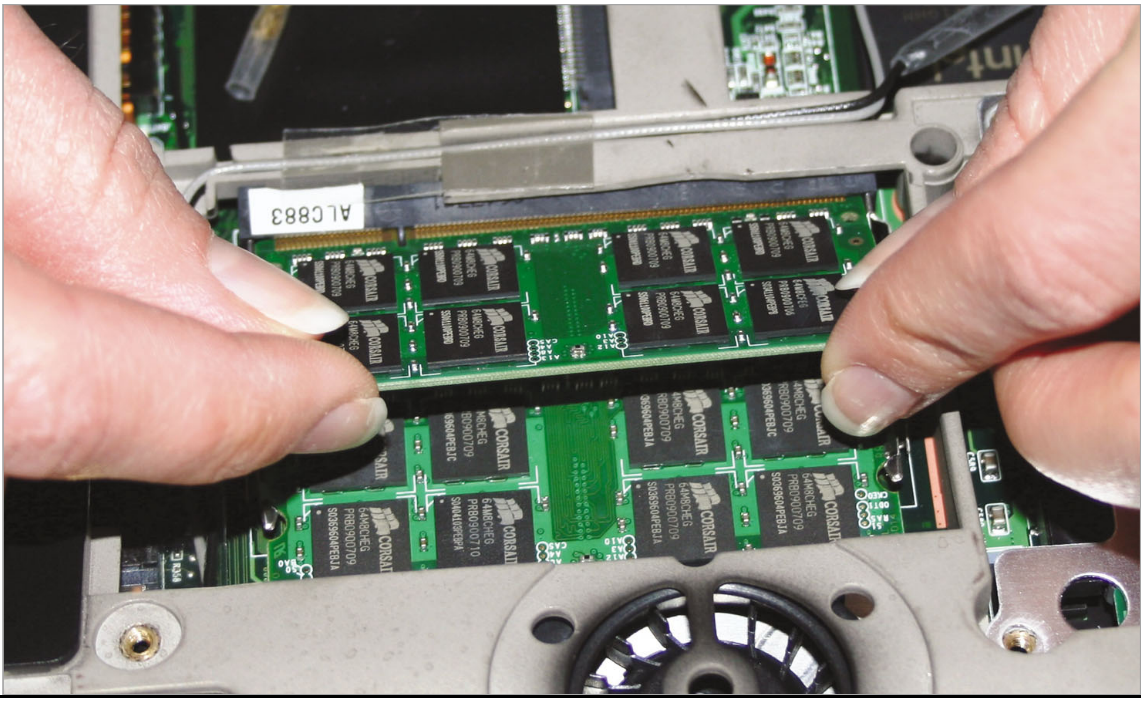
Update and surf. Once you have assembled your notebook and installed the OS, connect to the Internet and run Windows Update. Also, check that your drivers are up-to-date. ▲



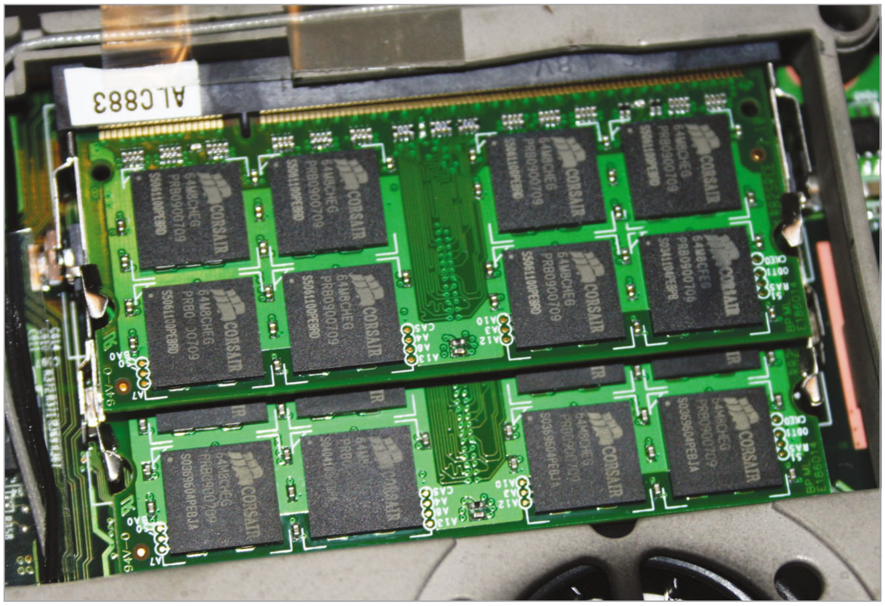
Turn the hard drive over and match the slot with the socket on the motherboard. Use gentle pressure to slide the hard rive into place and secure it with the metal cover plate.

hard drive, match the pin orientation on the drive to the barebook's SATA connector and slide the hard drive into place. Secure the drive using the cover plate that accompanies the barebook. We noticed that the screws on our 2.5-inch drive are on the bottom of the drive, as opposed to the sides like most 3.5-inch desktop models. Pay close attention to align the cover plate with both the drive and the back casing screw holes to avoid difficulty in putting the notebook back together at the end of the build.

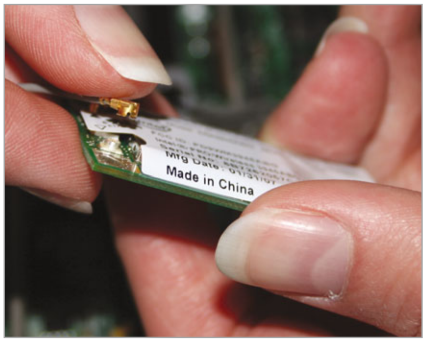
The Intel 945PM chipset in the Clevo M570U supports dual-channel DDR2



Match the notches, slide the first memory module into place until it clips, and repeat.



Some notebooks have two memory bay locations, which can be a pain if you're swapping out memory. The M570U's two memory bays are stacked, which makes it really easy to get to them.



Attach the antennas for the wireless network card. If you can't get them attached by hand, try a flathead screwdriver.

Once we attached the wireless antennas for the wireless network card, we slid the card into place at a slight angle.

Don't forget the optical drive. It's a simple but important step.

running at up to 667MHz and provides up to 10.7GBps of bandwidth. For optimal performance, we chose two matching 1GB dual-channel modules. Because the two memory modules are stacked on top of one another in the same location on the underside of the M570U, installing the memory is a snap. Hold the memory at a slight angle, match the notch in the first memory module with the key in the memory slot, and slide the memory into place until it clips into position on both sides; repeat for the second module.

Before installing the combination wireless/Bluetooth card, attach the antennas to the appropriate contacts, being careful not to tug on the antennas. Our card had a sticker as a guide that indicated which color-coded antenna to attach to each contact. If you can't get the antennas to snap into the receptacles by hand, a flathead screwdriver might help. Keep the antennas on top while holding the card at a slight angle and matching up the notches (just as you did with the memory modules). Then slide the card into position. Once the card snaps into place, use the included screws to secure it in place.

Finally, slide the DVD drive into place, paying attention to slide the drive in right-side up with relation to the notebook. It should click into position. Our drive didn't require any screws, and we could easily tell once it was securely in place. Then, reattach the back casing and put in the battery. Now that everything is installed, plug in the notebook to charge the battery and start installing

Benchmark Numbers

3DMark06 (1,280 x 1,024)	
3DMark Score	5457
SM2.0	2247
HDR/SM3.0 Score	2182
CPU Score	2019
PCMark05 (1,280 x 1,024)	
PCMark Score	6261
CPU Score	5945
Memory Score	4424
Graphics Score	8166
HDD Score	4727
Oblivion (HDR Enabled; 1,280 x 1,024)	
Dungeon	67.74
Town	63.5
Outdoor	41.12
Oblivion (HDR Enabled; 1,920 x 1,200)	
Dungeon	63.09
Town	56.02
Outdoor	24.55
Quake 4 1.3	
1,280 x 1,024	75.11
1,920 x 1,200	51.29
F.E.A.R. 1.07	
1,600 x 1,200	44
1,920 x 1,200	37

your OS, games, and other applications. Our assembled monster weighs just over 9.25 pounds but is still lighter than some of the powerhouse notebooks we've seen.

The Results

Today's notebooks and desktops can't compete on exactly the same playing field because of hardware and software differences. That's not to say that today's notebooks can't make fine gaming machines. Although you'll have to make small tradeoffs in hardware and software (such as DirectX 10 capability) in order to gain mobility, our notebook really strutted its stuff in our standard array of benchmark tests.

So how did our notebook stack up? Our custom-built machine scored a 5457 in 3DMark06 (1,280 x 1,024) and a 6261 in PCMark05 (1,280 x 1,024). It blew through a custom Quake 4 demo at 75.11fps and managed an average of 44fps in F.E.A.R. (1,600 x 1,200). We also put this notebook through the paces of three custom Oblivion demos (1,280 x 1,024). In the custom dungeon demo, our 'book scored 67.74fps and managed 41.12fps in the more demanding outdoor demo. ▲

by Jennifer Johnson

Vista vs. XP

Vista fans, don't get too hooked on DirectX 10 just yet. Although you may have Vista on your desktop, it may not be as worthwhile for your notebook. In fact, Vista will likely decrease your notebook's gaming performance. We installed Windows XP on the notebook we built for a few reasons. First, Vista doesn't support all of our older, but still beloved hardware, such as joysticks, gaming mice, and gaming keypads. Gear makes a difference, and we're not willing to give it up. Secondly, although we configured our barebook with a top-of-the-line mobile GPU, an Nvidia GeForce Go 7950 GTX, it won't support DX10. (No mobile GPU supports DX10 at the time of this writing.) Third, although Halo 2, which will require Vista, is around the corner, there aren't any DirectX 10 games available right now. Finally, without DX10, Microsoft has said that you will take a 10 to 15% performance hit while gaming with Vista. Plus, our older DX9 games will perform better in WinXP running DX9. Because we wanted a gaming machine, our best bet was WinXP, at least for the time being.

Still, Vista has some definite advantages in the mobility realm. In fact, Vista has a whole section in the Control Panel dedicated to mobile PCs. If these features interest you, it might be worth taking a slight hit in performance. Some of the new mobile features in Vista include:

Windows Mobility Center. A new control panel called Windows Mobility Center centralizes information and functionality for mobile PCs. It's available in Home Premium, Business, Enterprise, and Ultimate editions. Mobility Center includes controls for brightness adjustment, sound adjustment, battery level and power scheme selection, wireless network status, screen orientation, external displays, synchronization to other machines, and presentation settings. Although you can change these mobile settings in WinXP, Vista's Mobility Center gives you a centralized location from which to do so.

Sync Center. Sync Center manages data synchronization between multiple PCs, network servers, external devices, or any combination of the above. You may recall the Synchronize feature on WinXP that's located in the Accessories portion of the Start menu. This feature supports a variety of Windows devices and uses Auto-Recognition and ActiveSync. Vista's improved Sync Center unifies the sync process for portable devices such as phones, PDAs, and digital music players. Overall, it's more of a one-stop-shop synchronization in Vista.

Power Plans. Vista's battery icon in the notification area lets you select a Power Plan. Power Plans control both hardware and software settings to help you manage how your computer balances the tradeoff between power consumption and system performance. Vista has three Power Plans: Balanced, Power Saver, and High Performance that you can tweak to suit your needs.

Vista also includes a new sleep power state. The Sleep function combines Standby and Hibernate and saves information from the computer's memory to the hibernation file on the hard drive. Instead of turning off the computer, Sleep mode enters Standby mode and then shuts down or hibernates after a specified amount of time. As a result, if the notebook loses power while in Standby mode, it can resume from the hibernate image on the disk. Additionally, if your battery is running low, Vista will save your work to the hard drive and turn off the notebook. The Sleep function also offers the benefits of short suspend and resume times while in Standby mode. Finally, a new Away mode feature automatically turns off displays, video rendering, and sound but keeps the computer operational while you're away.

Portable and mobile devices. Windows Portable Devices provides a framework for devices such as media players, storage devices, and your notebook to communicate with Windows Vista directly, without having to install separate software. Windows Mobile Device Center also gives you a central place to manage your external mobile devices by making it easy to manage settings, media, and other files on the device, including devices running Windows Mobile.

Windows SideShow. If your notebook has a small, external display, then Windows SideShow is for you. Windows SideShow controls the display and makes it possible to view different kinds of information, such as contacts, maps, calendar, and email without fully booting the notebook.

Ready, set, present! Whether you're giving a presentation or just want to hook up your notebook to an external monitor or projector, you'll probably need to change a few settings to get the best output. This is particularly easy using Vista's Presentation Settings, which lets you save and access display preferences for an external monitor or projector. Presentation settings will automatically turn off when you disconnect your notebook from a projector or monitor and shut down or log off your computer.

When you connect a notebook to an external display, Vista will open the New Display Detected dialog box and give you the option to mirror the Desktop to the display, extend your Desktop to work in a dual-monitor configuration, or use the external display as the sole display. ▲

POWER USER ACCESSORIES

Give Your Notebook An Accessory Boost

As with any other portable devices, the notebook has spawned an ever-growing market for accessories. Travel mice, Web cams, keyboards, and lights abound in airport newsstands and electronics stores, and notebook bags have large enough pockets to accommodate all the tools that manufacturers left out of your ultralight notebook.

Microsoft Wireless Notebook Laser Mouse 6000

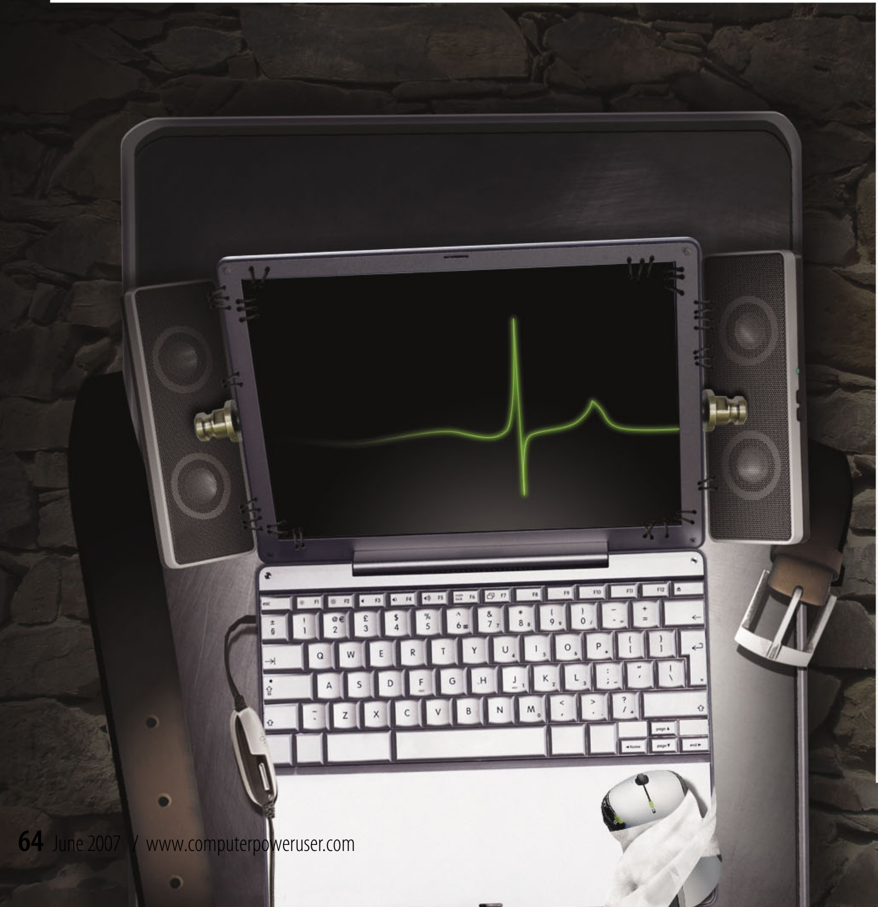
We like mini-mice because we can use them with ease in cramped quarters such as coach class on an airplane. Although we're not adverse to corded notebook mice, we're always looking to reduce clutter when we travel, so it's no surprise that we're fans of Microsoft's wireless notebook mouse. The device is much smaller and lighter than your average desktop mouse and has a compartment for the USB wireless receiver (when it's not in use). The 6000's accurate and handles fast movements, thanks to a 1,000dpi resolution and support for up to 6,000fps. Our favorite feature: the Magnifier toggle button, which lets you zoom in on any portion of the screen.

Wireless Notebook Laser Mouse 6000
$49.95
Microsoft
www.microsoft.com

Logitech V10 Notebook Speakers

Headphones may be a traveler's must-have notebook accessory, but when you want to kick back poolside at your hotel, you'll be glad you toted these handy little speakers along. The V10 speakers offer plenty of sound for you and some friends, and they sound pretty darn good in our opinion. The speakers draw power from your notebook's USB port and have their own volume control buttons (though you can also control the volume via your media player software, of course). A special travel bag stores your tiny speakers and related cables on trips.

V10 Notebook Speakers
$49.99
Logitech
www.logitech.com



Kensington WiFi Finder Plus

Wi-Fi finders aren't the most exciting devices around, but they come in handy if you want to check for wireless connectivity without firing up your notebook. Kensington's WiFi Finder Plus has a column of LEDs that indicate signal strength for any 802.11b/g networks in range. Of course, a positive test doesn't mean that the network is accessible, but you can rest assured that you're looking at a true network, as the Finder filters out irrelevant 2.4GHz signals (such as microwave ovens and cordless phones). The keychain device also has a moderately bright flashlight and an LED that denotes active Bluetooth networks.

WiFi Finder Plus
$29.99
Kensington
www.kensington.com

Targus Notebook ChillHub

Although notebooks are more power-efficient than most desktop PCs, there's still plenty of heat trying to find its way out of your notebook right now. Whether it's sitting on your lap or your desk, heat builds up between the bottom of the notebook and the surface on which it sits. If you want to blow off some of your notebook's steam, check out the Targus ChillHub, which props up your notebook at a moderate angle, helping hot air escape. The hub also includes two exhaust fans that force hot air behind your computer. Thanks to a power adapter, the ChillHub includes a four-port USB 2.0 hub.

Notebook ChillHub
$49.99
Targus
www.targus.com

Memorex Mega TravelDrive 12GB

The "Mega" in this TravelDrive's name refers to its significant storage capacity rather than its size. The 12GB drive is physically a little larger than your average USB flash drive, but it's still very pocketable. Instead of having a cap, the USB 2.0 connector swivels completely into the device. When you plug the TravelDrive into your computer, you'll find that you won't have much trouble with other nearby USB connectors; the drive's connector can swivel beyond a 90-degree angle to accommodate a crowded notebook. As with other flash drives, this spacious device runs off your notebook's power.

Mega TravelDrive 12GB
$149.99
Memorex
www.memorex.com

SOLO Laptop Messenger Bag

Notebook bags are easy enough to come by these days, but we get the impression that some bag designers think we geeks have no sense of style. Thus, we're glad to see SOLO's new brightly colored, shapely messenger bag, which includes a pocket for a 17-inch (or smaller) notebook. The pocket has enough padding to protect your notebook from life's daily bumps, and the bag has all the pockets you'll need to store life's daily stuff. The mobile phone pocket isn't as handy as we'd like, as it's tucked under the bag flap. Even so, it's one of the most fashionable and comfortable notebook bags we've hefted onto our geeky (but oh-so-stylish) shoulders.

Laptop Messenger Bag
$49.99
SOLO
www.solocases.com

Targus Travel USB 2.0 4-Port Hub With Notebook Light

Those of us who use the time-honored hunt 'n' peck typing method put more stock into those seemingly gimmicky USB notebook lights than other gadget gurus. After all, your notebook screen may not light your keyboard very well in a dark environment. To that end, Targus mounted a bright LED light to the top of its Travel USB 2.0 4-Port Hub. Both the light and USB connector tuck into the hub's case when you pack it up, and both have swivels that let you adjust the hub to fit your needs. You can shine the light directly onto your keyboard while the hub's connector is plugged into your notebook, or you can clip the light to your notebook screen (the hub includes a USB extension cord).

Travel USB 2.0 4-Port Hub With Notebook Light
$29.99
Targus
www.targus.com

Logitech Alto

Although many people are perfectly comfortable typing on angled keyboards (such as the keyboard of a notebook on an angled stand), there are plenty of us who like our keyboards the way we like our pancakes. To that end, Logitech offers the Alto, a portable notebook stand that props up your notebook and provides a full, horizontal keyboard that includes media keys, a number pad, and LEDs that indicate NUMLOCK and other statuses. The stand also includes a three-port USB hub, which handles smaller USB devices such as flash drives. If you plan to attach power-hungry USB devices, you'll need to invest in a $19.99 external power adapter.

Alto
$99.99
Logitech
www.logitech.com

Kensington 7-in-1 Media Reader For ExpressCard Slot

This brand-new media card reader sits neatly in your notebook's ExpressCard slot and accepts seven types of media cards. We like being able to pop it into our notebook and forget about it; the card sits flush with the edge of the notebook, so you can slide the computer into your notebook case without damaging anything. The card reader handles microSD, miniSD, SD, Memory Stick, Memory Stick Pro, MMC, and xD cards and supports Windows XP/Vista, as well as Mac OS X 10.2.8 or newer (on an Intel-based Apple notebook).

7-in-1 Media Reader For ExpressCard Slot
$39.99
Kensington
www.kensington.com

Anycom Foldable Keyboard BFK-200

Anycom's BFK-200 is one of the most portable keyboards we've seen. It's small to begin with (the keyboard doesn't have a traditional number pad), but it's just a little larger than a wallet once you fold it in half and slip the device into its travel bag. The BFK-200 is a Bluetooth keyboard (thanks to two AA batteries), which means no clutter, and it has a detachable stand that props up your Bluetooth-enabled Pocket PC PDA or smartphone. Of course, it's not limited to super-portable devices: You can also connect the board to Bluetooth-enabled notebooks or desktops that have WinXP or Mac OS X.

Foldable Keyboard BFK-200
$149.99
Anycom
www.anycom.com

Belkin Bluetooth Wireless USB Printer Adapter

Remember those heady days in the early aughts when Bluetooth seemed poised to change networking for everyone, everywhere? Although Bluetooth didn't enjoy the instantaneous leap to stardom some of us expected, it's still around and connecting tech-savvy travelers to their gear. If your trips take you to the office or home printer from time to time, you'll like this wireless USB printer adapter. The Bluetooth 1.1 device supports Win98/Me/2000/XP computers, as well as any mobile PDA types running Palm OS or Microsoft Pocket PC 2002/2003. The printer adapter includes its own power cord and a utility CD but lacks the USB cable you'll need to connect it to your printer.

Bluetooth Wireless USB Printer Adapter
$99.99
Belkin
www.belkin.com

LapWorks Aluminum Desktop Stand

If your notebook sits on a desk and you find that your neck or back hurts, you may need to raise your notebook to eye level. To that end, LapWorks offers the Aluminum Desktop Stand, which is a travel-friendly stand that holds your notebook at a steep angle. Thanks to its design, the stand lets your notebook's screen sit at eye level. Of course, this means the notebook keyboard is at an angle, but we found that we could type easily without any discomfort. The stand swivels and includes its own neoprene travel bag. We like this stand, but not its steep price.

Aluminum Desktop Stand
$69.95
LapWorks
www.laptopdesk.net

Western Digital Passport Portable WDXMS1600

Sure, you can make your own external hard drive by tossing one of your old drives into an inexpensive external drive case, but unless that's a 2.5-inch drive, you're looking at a pretty bulky device. If it's portability you're after, Western Digital's prebuilt WD Passport Portable WDXMS1600 fits the bill. The 160GB prebuilt external hard drive uses a USB 2.0 interface to transfer data and spins at 5,400rpm. That's not nearly as fast as some Western Digital drives, but it's plenty fast for a hard drive that's only 0.59 x 3.14 x 5.11 inches (HxWxD). The drive runs off your notebook's power and has a protective travel case.

Passport Portable WDXMS1600
$169.99
Western Digital
www.westerndigital.com

Kensington 120W Notebook AC/DC Power Adapter

Kensington's Notebook AC/DC Power Adapter is more versatile than your laptop's existing adapter thanks to its modular design. The 120W adapter's attachments let it plug into your wall outlet or into a car cigarette lighter. The package includes a travel bag and several tips that let the adapter connect to many Dell, Gateway, HP, IBM/Lenovo, Sony, and Toshiba notebooks. You can buy additional tips for a variety of notebooks and other gadgets at Kensington's site. We like the adapter's low profile: It weighs only 6 ounces and is 0.66 x 3.1 x 5.6 inches. Unfortunately, the adapter doesn't seem to be any better at keeping cool than the average notebook adapter. It's uncomfortably hot to the touch within minutes of powering your notebook.

120W Notebook AC/DC Power Adapter
$139.99
Kensington
www.kensington.com

Belkin Hi-Speed USB 2.0 15-in-1 Media Reader & Writer

Media card readers are commonplace on today's PCs, but many notebook users rely on external readers that attach via a USB port. Belkin's Media Reader & Writer is one such device, and it'll cover all your media card bases. The wallet-sized device handles the usual suspects, including CF I and CF II, miniSD and SD, and xD, as well as IBM Microdrive and SmartMedia. It can also handle Memory Stick, Memory Stick Pro, Memory Stick Pro Duo, and Memory Stick MagicGate cards. You can plug Memory Stick Duo and Memory Stick MagicGate Duo cards into the unit, too, but you'll need to plug in the card's adapter. The reader itself runs right off your notebook.

Hi-Speed USB 2.0 15-in-1 Media Reader & Writer
$39.99
Belkin
www.belkin.com

Addonics FireWire/USB 2.0 ExpressCard Adapter

Running out of ports? If your notebook has the new ExpressCard slot, this

FireWire/USB 2.0 ExpressCard Adapter
$49.95
Addonics
www.addonics.com

adapter is worth a look. Unlike larger portable hubs, which have cables and bulky bodies, Addonic's new card keeps the adapter close to your notebook. The device boosts your notebook's current connectivity offerings with a USB 2.0 port and two FireWire 400 1394a ports. Of course, there's a bit of a catch: If you want to plug in a device that draws much power from one of those ports, you'll need to add a $15 5V AC/DC adapter (USB drives work fine). The FireWire/USB adapter supports Win 2000/XP and Windows Server 2003 officially; it also ran fine on Vista.

Logitech VX Revolution

Although the VX Revolution isn't the smallest notebook mouse on the block, it's one of best. The mouse's scroll wheel tilts left and right and even has a switch that lets you choose between a fast, smooth scroll and the traditional precision scroll. The mouse also boasts a zoom in/out switch and a One-Touch search button. Once you highlight a word and press the search button, your favorite search engine opens and uses the highlighted word as a search term. As with Microsoft's Notebook Laser Mouse 6000, the Logitech mouse stores its USB wireless receiver inside the body of the mouse. The mouse turns on when you remove the receiver and then powers back off as soon as you pop the receiver back into the mouse.

VX Revolution
$79.99
Logitech
www.logitech.com

Logitech Premium Notebook Headset

Logitech's notebook-friendly device is surprisingly comfortable for a collapsible headset. It features two adjustable earpieces that slide forward and backward to suit your head. The headset itself wraps around your head horizontally without putting any real pressure on your ears. Sadly, the boom isn't flexible, but it swivels up and down, which was all the adjustability we needed to use it comfortably. Logitech rounds out this package with in-line volume controls and a USB adapter. That's right, if you can't plug the headset into standard audio ports, you can simply attach the USB adapter and plug it into a free USB port. A hard protective case keeps your headset safe when you're on the road.

Premium Notebook Headset
$59.99
Logitech
www.logitech.com

Logitech QuickCam For Notebooks Pro

Forget the days of bulky Web cams that ate up valuable space in your notebook bag. If your notebook doesn't have a built-in Web cam, you can rectify the situation with this tiny video camera. The QuickCam For Notebooks Pro's clip has soft feet that let it connect to your notebook's screen casing without damaging your notebook. We like the Web cam's video quality and its 1.3MP still photo capture feature. You can clip the Web cam to the included desk stand when you're at home and then toss it into the protective Logitech case when you're on the road. The camera supports popular IM services and Skype and has some great video avatars that move their mouths, eyes, and heads when you do.

QuickCam For Notebooks Pro
$99.99
Logitech
www.logitech.com

Kensington Notebook Expansion Dock With Stand

The Notebook Expansion Dock With Stand won't win any awards for a small footprint, but once you've set up this slick device, you won't care. The stand holds your notebook almost upright so that the notebook's screen is at eye level (a chart helps you adjust the stand to the appropriate height). The front of the stand blocks your notebook's keyboard, which means you'll need to have a USB keyboard (or wireless keyboard) handy. The dock, which can detach from the stand, has three audio ports, a 10/100 Ethernet port, a printer port, a serial port, and three USB 2.0 ports. The easy-to-use stand makes your notebook a great desktop companion but lets you grab the notebook and go by simply unplugging a USB cable. ▲

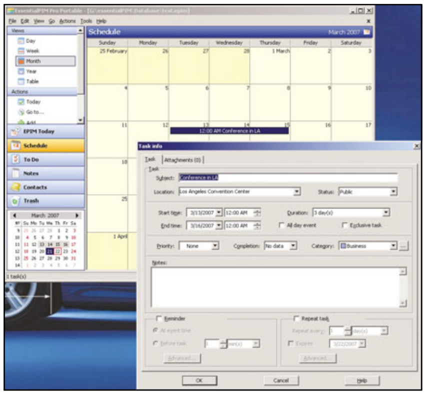
Notebook Expansion Dock With Stand
$139.99
Kensington
www.kensington.com

by Joshua Gulick

The Bleeding Edge Of Software

Inside The World Of Betas

EssentialPIM Pro Portable 2.0 Beta 2



Subject: Conference in LA
Location: Los Angeles Convention Center
Status: Public
Start time: 3/13/2007 12:00 AM
End time: 3/16/2007 12:00 AM
Duration: 3 day(s)
Priority: None
Completion: No data
Category: Business

Official product name: EssentialPIM Pro Portable
Version # previewed: 2.0 Beta 2
Publisher: EPIM
Developer and URL: EPIM; www.essentialpim.com
ETA: Q2 2007
Why you should care: A quality, portable, and optionally free PIM is always worth a look.

Keeping track of all the personal bits of information that make up your life is always tough, but that's not for a lack of choices. PDAs and smartphones are one answer, as are online options such as Google Calendar and Yahoo! Calendar, and there are always PC-based options such as Outlook. Still, these may not be the best options for some users, so for them there's EssentialPIM. There are four versions of EssentialPIM: two EssentialPIM Free editions (a desktop and a portable version) and two EssentialPIM Pro versions (desktop and portable). The EssentialPIM Pro Portable version is now out in beta, but all of the versions work almost identically.

As its name suggests, you can install the Portable version on a portable drive, such as a USB flash drive, compact flash card, or floppy disk, making it perfect to keep with you wherever you go—provided the destination has a Windows-based PC with a USB port. Also, Pro Portable offers 128-bit encryption, so even if you lose your drive, your personal information should be safe.

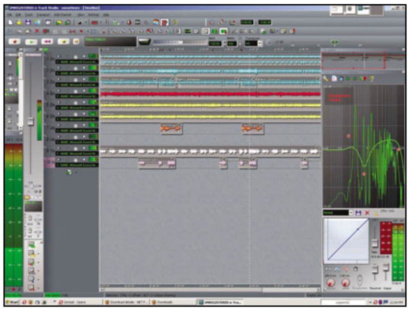
EssentialPIM has an intuitive interface that invites you to explore it, a bright and attractive color scheme, and the ability to drag-and-drop everywhere. The PIM remembers data as you type it, making it easier to reuse later.

Data exchange is one of EssentialPIM's strong suits. The information manager automatically syncs data from Outlook, the address book from Outlook Express, and schedules from iCal and Google Calendar, for instance. It can also import/export data from CSV, HTML, RTF, and other formats. Synchronizing with many Windows Mobile devices is possible, but, as of this writing, Essential PIM Pro Portable didn't support Palm OS devices.

As this is the last of the EssentialPIM 2.0 betas, it's very stable and polished and even includes a thorough Help file. As such, Pro Portable is worth entrusting your personal data to. ▲

by Warren Ernst

n-Track Studio 5.0.6 Build 2257



Official product name: n-Track Studio
Version # previewed: 5.0.6 Build 2257
Publisher: Flavio Antonioli
Developer and URL: Flavio Antonioli; www.ntrack.com
ETA: Q2 2007
Why you should care: There's no better sound mixer available for the price.

On the totem pole of audio utilities, I think n-Track Studio 5 is just about three-fourths of the way up, but it's priced like an audio utility closer to the bottom of the pole at $54 (standard version). Looking and feeling something like a shareware version of Apple's GarageBand, n-Track is a full-featured audio mixer that gets better and better with each update.

At its heart, n-Track is a multiline recorder and mixer, limited only by your PC hardware. If you have five sound cards (16- or 24-bit), for example, n-Track can record five stereo lines at once at up to a 192KHz sampling rate. Once recorded, you can add other MIDI files on their own tracks and then mix down all of them into a single WAV file.

Although n-Track isn't really a sound editor (you'll still need Audacity or Sound Forge for some conversion and most editing duties), it comes with all of the filters you need to add reverb and echo, alter pitch without altering speed (or vice versa), or adjust volume (either manually or automatically). In addition, n-Track applies real-time audio effects nondestructively, so you can always go back to your unaltered source WAV files. You can also add DirectX and VST plug-ins for other effects.

The latest beta adds several small bug fixes and tweaks to existing features. If you haven't checked out n-Track lately, you will be surprised by its many GUI enhancements, including full skinning options, dockable and (sometimes) resizable palettes, and a better drag-and-drop environment. Active development of n-Track Studio continues, so if you need a feature or discover a bug, there is a good chance you will get a response quickly. ▲

by Warren Ernst

UP TO SPEED

Upgrades That'll Keep You Humming Along

This is a major update month. The new iTunes gets AppleTV support, Boot Camp now supports Windows Vista, and even the portable world (Zune and PSP) gets significant new firmware.

Upgrades

Adobe Creative Suite 3

Six massive collections of Adobe's line of design software should be available (or available soon) as you read this. The combinations include the latest upgrades of standalone apps such as Photoshop CS3, InDesign CS3, Dreamweaver CS3, After Effects CS3, etc. At the heart of many of the tools is Adobe's Flash CS3, which the suites can manage across Web and mobile platforms.

Get it at: www.adobe.com

Apple Boot Camp 1.2 Beta

Apple Boot Camp now supports Vista (32-bit). There is also support for the Apple Remote in iTunes and Windows Media Player and an Apple Software Update program specifically for WinXP/Vista. Better Windows driver installation and international keyboard support comes with this release, as well.

Get it at: www.apple.com

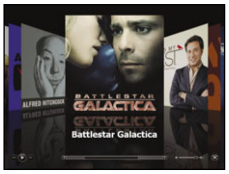
Google Desktop 5 Beta

The system-wide search tool gets an improved Google Sidebar with better design and gadget differentiation for easier scanning. Google also adds better file preview support in search results. Also, as we went to press, Google had released Google Desktop for the Mac.

Get it at: www.google.com

iTunes 7.1.1.5

A number of incremental iTunes upgrades continue to flow from Apple as it fixes compatibility issues with Vista. The newest version also adds AppleTV support and full-screen Cover Flow browsing. Anyone continuing to have problems with Vista detecting or properly ejecting the iPod should also look into recent Vista updates.



Get it at: www.apple.com

MediaMonkey 3.0.0.1026 Alpha 3

This update adds, among other things, album art for FLAC files, a Vista-like hierarchy browser, and a search history. MM also improves album art management overall UTF-16 tagging behavior.

Get it at: www.mediamonkey.com

Minimo 0.2

This browser for Windows Mobile devices comes to us from Mozilla and sports some of Firefox's signature features; for example, tabbed browsing Ajax/JavaScript support, RSS feeds, and security.

Get it at: www.mozilla.org/projects/minimo

Nero 7 Ultra Edition Enhanced 7.8.5.0

With the 7.8.5.0 update, Nero 7 Ultra Edition is now compatible with SecurDisc data protection. Also, you get full AVCHD and BD-AV authoring and playback and improved graphics and features for Vista. In addition, a new DiskCopy gadget lets you copy to a disc with one click.

Get it at: www.nero.com

OpenOffice.org 2.2

This update includes many changes, including, changes to the field length in the bibliography database, UTF-8 encoding in the dBase database, and changes in the defaults of the date and time fields.

Get it at: www.openoffice.org

Paint.NET 3.05

Paint.NET gets a new Pencil Sketch effect, compatibility with Vista, and more efficient menus in some operations with this update.

Get it at: www.getpaint.net

Red Hat Enterprise Linux Advanced Platform 5

The main new features in this update revolve around storage virtualization technologies that purport to make the OS easier to deploy and manage.

Get it at: www.redhat.com

TurboBackup 6

TurboBackup now includes templates for video, Registry, and Vista Windows Mail backups. FileStream also includes new support for RAID 1 mirroring and a revised tabbed interface in this version.

Get it at: www.filestream.com

Driver Bay

AMD/ATI Catalyst 7.3

These new drivers for Radeon cards add OpenGL CrossFire support in Vista for the entire X1000 line and CrossFire enhancements for the OS. They also help improve performance in Dark Messiah Might And Magic when running CrossFire.

Get it at: www.ati.amd.com

PlayStation Portable 3.30 Firmware

The latest update for the PSP notably adds support for H.264-encoded video at 720 x 480 and thumbnails for the video directory. Also new is a setting called Use Wireless Hotspot for easy access to wireless hotspots.

Get it at: www.us.playstation.com

Zune 1.3 Firmware

Microsoft says that this release fixes skipping issues with some Zune Marketplace downloads, enhances device detection and syncing, and improves the way the FM tuner draws power during sleep mode.

Get it at: www.zune.net

by Steve Smith

Microsoft Office 2007

It's Time For An Upgrade

With many power users underwhelmed with Internet Explorer 7 and Windows Vista, some may have been expecting the release Microsoft Office 2007 to round out Microsoft's 2007 trifecta of mediocrity. If you fit into this category, then we have news for you: Microsoft hit one out of the park with Office 2007. Although there were only relatively minor changes in recent versions of the office suite, Microsoft dramatically altered the interface of Office's core applications for the better, added new file formats that offer real benefits both to users and third-party developers, added new and useful products to the suite while eliminating bad ones, and (oh yes) added many new features that are actually useful to existing products. In short, if you've been retaining Office 97, 2000, 2003, or XP for many years because your version has been "good enough," Office 2007 will impress you; it's the first Office in years worth the upgrade.

As with Vista, Microsoft has released several versions of Office 2007, and almost all of them are available at a reduced cost via an upgrade version. You'll find a chart on page **72** that lists the different versions, including those that are only available via a volume license (intended for large enterprises), as well as Office Basic, which is only available as an OEM bundle with a new computer. All versions include Word 2007, Excel 2007, and PowerPoint 2007 (except Office Basic, which swaps out PowerPoint for Outlook 2007), with the more expensive bundles offering more applications. Interestingly, almost all of the Office applications are also available individually, so if you want everything that comes with, say Office Professional, but absolutely have to have OneNote 2007, as well, simply purchasing it in addition to Office Professional is less expensive than buying Office Ultimate.

Because of the wide variety of packages, it was tough to comment on Office 2007's overall value or limit myself to reviewing simply the core applications. As such, in this review I'll look at changes and improvements to the suites overall (such as Office 2007's new system requirements), new interface changes, and new file formats and then look at the improvements to the Office applications you already know and love and check out a few of the new members of the Office family.

System Requirements & Performance

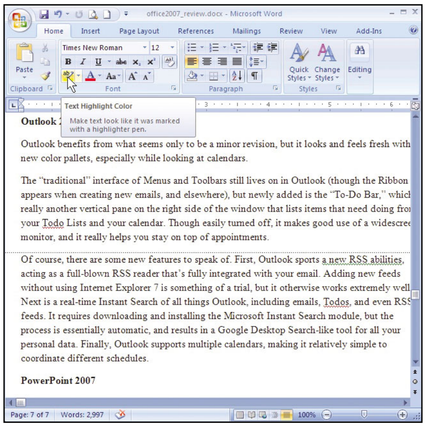
Contrary to popular belief, you do *not* need Vista to run Office 2007 (WinXP SP2 works fine); however, the software doesn't support older versions of Windows including Win2000. The full install of Office Ultimate and Enterprise takes about 2GB of storage space with each of the apps consuming much more RAM than its predecessors; for example, Word 2000 takes 19MB of RAM vs. Word 2007's 67MB. Still, the typical new computer in the year 2000 had a Pentium 3 running at 500MHz and only 256MB of RAM (which is, incidentally, Office 2000's minimum hardware requirement), so given all of Office 2007's improvements, this isn't unreasonable.

Performance is quite good on modern machines, while machines closer to the minimum specification requirements may experience somewhat long initial load times, but that's about it. Tabs and menus spring to life quickly when you click them, and intensive tasks such as print previews appear immediately even on older machines. Computers lacking the minimal required RAM do experience a bit more disk swapping when switching programs, but adding as little as 512MB of memory really helps in this area.

Interface Improvements

It has been said that 90% of Office's users use only 20% of Office's features, but perhaps that's because of Microsoft's default settings only showing recently used commands in the menus. This "feature" seems to discourage many users from exploring different commands and features because they were hidden from view almost all the time. Dialog boxes with 10 or more tabs didn't help matters either. Microsoft was almost certainly aware of this when it chose to totally revamp Office 2007's primary interface by removing almost all drop-down menus from its core Office applications. I consider the switch a rousing success in usability and the first real interface improvement Office has seen in a decade.

There has been a lot of talk about Microsoft eliminating the conventional menu and toolbars in Office 2007 and replacing them with the Microsoft Office Fluent UI. There are nine components



Outlook

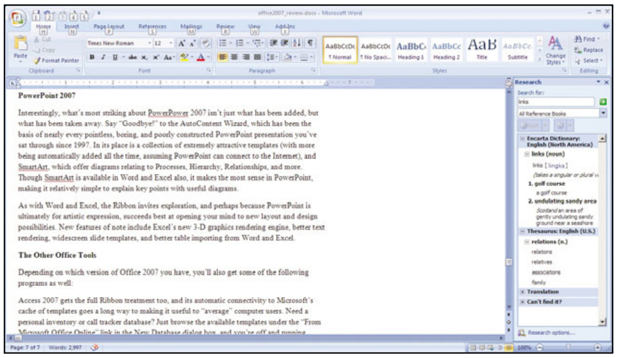
Outlook benefits from what seems only to be a minor revision, but it looks and feels fresh with new color pallets, especially while looking at calendars.

The "traditional" interface of Menus and Toolbars still lives on in Outlook (though the Ribbon appears when creating new emails, and elsewhere), but newly added is the "To-Do Bar," whic really another vertical pane on the right side of the window that lists items that need doing fro your Todo Lists and your calendar. Though easily turned off, it makes good use of a widescree monitor, and it really helps you stay on top of appointments.

Of course, there are some new features to speak of. First, Outlook sports a new RSS abilities, acting as a full-blown RSS reader that's fully integrated with your email. Adding new feeds without using Internet Explorer 7 is something of a trial, but it otherwise works extremely well Next is a real-time Instant Search of all things Outlook, including emails, Todos, and even RSS feeds. It requires downloading and installing the Microsoft Instant Search module, but the process is essentially automatic, and results in a Google Desktop Search-like tool for all your personal data. Finally, Outlook supports multiple calendars, making it relatively simple to coordinate different schedules.

PowerPoint 2007

An auto-sizing Ribbon (shown on a narrow window here) and descriptive Tooltips immediately grab your attention as elements of the new Office interface.



PowerPoint 2007

Interestingly, what's most striking about PowerPower 2007 isn't just what has been added, but what has been taken away. Say "Goodbye!" to the AutoContent Wizard, which has been the basis of nearly every pointless, boring, and poorly constructed PowerPoint presentation you've sat through since 1997. In its place is a collection of extremely attractive templates (with more being automatically added all the time, assuming PowerPoint can connect to the Internet), and SmartArt, which offer diagrams relating to Processes, Hierarchy, Relationships, and more. Though SmartArt is available in Word and Excel also, it makes the most sense in PowerPoint, making it relatively simple to explain key points with useful diagrams.

As with Word and Excel, the Ribbon invites exploration, and perhaps because PowerPoint is ultimately for artistic expression, succeeds best at opening your mind to new layout and design possibilities. New features of note include Excel's new 3-D graphics rendering engine, better text rendering, widescreen slide templates, and better table importing from Word and Excel.

The Other Office Tools

Depending on which version of Office 2007 you have, you'll also get some of the following programs as well:

Access 2007 gets the full Ribbon treatment too, and its automatic connectivity to Microsoft's cache of templates goes a long way to making it useful to "average" computer users. Need a personal inventory or call tracker database? Just browse the available templates under the "From Microsoft Office Online" link in the New Database dialog box, and you're off and running.

Given space, Office Ribbons can spread out to display more descriptions of available tools. Keyboard shortcuts appear when you hold down the ALT key, and online reference material is available on the right side of the screen.

that make up Office Fluent: Contextual Tabs, the Office Button, Galleries, Live Preview, Mini Toolbar, Enhanced ScreenTips, Quick Access Toolbar, KeyTips, and the Ribbon.

Most people are probably familiar with Office Fluent's Ribbon (check out the screenshots), but I think the best way to describe the Ribbon is as a set of more than half a dozen fluid and interactive toolbars each visible when you click its tab. Tabs for selecting each Ribbon take the physical position formerly held by each menu, so, in essence, what Microsoft has done is replace a text-based, vertically oriented menu with an icon and button-based horizontally oriented "menu." Microsoft arranges buttons and icons into logical groups within each Ribbon (for example, all Clipboard, Font, Paragraph, and Editing functions are grouped together on Word's Home Ribbon), and each group may expand to display more functions when you click it. Ribbons are capable of growing and shrinking as you narrow and widen the program window either by stacking buttons into a third row, nesting multiple buttons into single-button menus, or by replacing buttons with both words and icons to buttons with just icons. In this era where most notebooks and many LCDs are widescreens, this transformation makes a lot of sense.

Overall, this arrangement doesn't take any more space than the traditional arrangement of a menu bar and two (or three) rows of buttons on multiple toolbars, but it dramatically improves access to often-used commands and makes exploring for and locating new commands much more intuitive. Experimenting with rarely seen commands is actually pleasant and will undoubtedly get that 90% of Office's users to work with more commands than before. Extra Ribbons appear automatically when appropriate; for instance, when working on a table in Word, two Table Tools tabs called Design and Layout appear offering Ribbons appropriate to working with the table you select. Although this is like nothing I've ever seen before, the arrangement makes a lot of sense and should be easy for new and experienced users to pick up.

In addition to the Ribbon, each program has an Office Button that contains most of what was in the old Office File menu (such as the New, Open, Save, Print, and Close, commands). Each command gets submenus with options such as the ability to save different file formats. There's also the Quick Access Toolbar, which is incidentally the only user-configurable toolbar. The Quick Access Toolbar comes with Save, Undo, and Redo buttons by default, but you can easily add any of your favorite commands to it. Finally, all program options and default settings are accessible via the virtually invisible menu stub next to the Quick Access Toolbar (look for the upside down triangle). This tiny triangle is the new interface's only real misstep because Microsoft should have made it more noticeable.

Beyond the obvious Ribbon and other interface changes, there are many subtle interface improvements in Office 2007. There's a zoom slider in the lower-right corner of every window, making this previously underutilized feature very accessible and handy. Also, there are Super Tooltips that display well-written paragraphs and graphics when you put your cursor over a command. Semitransparent mini-toolbars pop up when you highlight text or cells, offering immediate access to frequently used commands based on selected content.

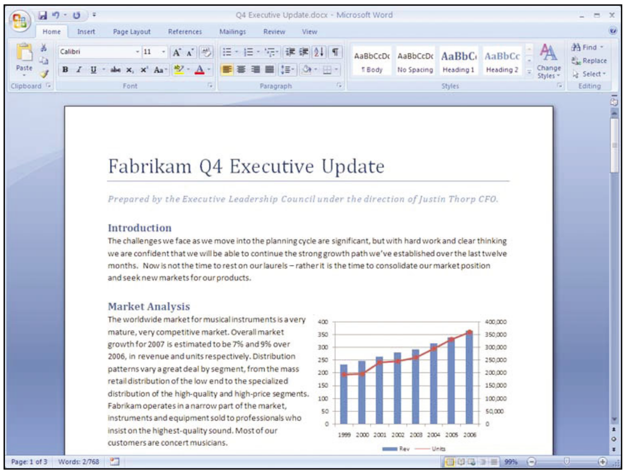
New Office File Formats

Amazingly, Microsoft has maintained essentially the same DOC, XLS, and PPT file formats since 1997, and these formats seemed to have caused undue problems for everyone else ever since. Office 2007's new formats promise to change all that.

The old Office formats are essentially OLE (object linking and embedding) containers with each file built like a mini file system. A DOC file, for instance, has its equivalent of a directory structure to manage different sections and files to store text strings and graphics. The whole arrangement is quite complex, written as a binary file and essentially undocumented, forcing everyone else to reverse-engineer the file formats, which leads to varying degrees of success when converting files.

The new Office formats, called Microsoft Office Open XML, are well-documented, text-based XML files all wrapped up in a ZIP container. This ZIP container makes files up to 75% smaller and relatively simple to convert and recover data from (in the case of damaged files) while supporting all of Office's features. It's also relatively easy to add new XML data and structure to these files with an XML editor, making integration with XML-based files and databases much easier. If you're an Office 2003 and WinXP user and encounter these files, the software should automatically prompt you to download and install two-way filters, making the transition virtually seamless. If you use Office 2000, you'll need to manually download and install import/export filters for full file compatibility.

Additionally, the new extension names themselves should help with security and reduce confusion. Basically, the new files add an "X" to the existing familiar Office extension, turning DOC into DOCX, XLS into XLSX, and so on. Anything with a macro baked into it (or an ActiveX control) gets an "M" appended instead (DOCM, XLSM, etc.), meaning you can easily avoid files potentially infected with



Fabrikam Q4 Executive Update

Prepared by the Executive Leadership Council under the direction of Justin Thorp CFO.

Introduction

The challenges we face as we move into the planning cycle are significant, but with hard work and clear thinking we are confident that we will be able to continue the strong growth path we've established over the last twelve months. Now is not the time to rest on our laurels – rather it is the time to consolidate our market position and seek new markets for our products.

Market Analysis

The worldwide market for musical instruments is a very mature, very competitive market. Overall market growth for 2007 is estimated to be 7% and 9% over 2006, in revenue and units respectively. Distribution patterns vary a great deal by segment, from the mass retail distribution of the low end to the specialized distribution of the high-quality and high-price segments. Fabrikam operates in a narrow part of the market, instruments and equipment sold to professionals who insist on the highest-quality sound. Most of our customers are concert musicians.

Here's a nice view of the new Office Fluent user interface in Microsoft Word 2007. The changes in Office 2007 are very noticeable in this venerable and widely used word processing program.

macro viruses, or, at the very least, a security program will double-check them.

Word 2007

Word is arguably the most-used component of Microsoft Office, so it isn't too surprising that it appears with every available version and seems to have the most new functionality.

Many of Word's new features seem intended for journalists and students. Also, there's a real-time word count always visible in the lower-left corner of the page. (You can even select some words and the count will show both the selected word count and the entire document's word count.) Citations, such as footnotes or bibliographies, are now a snap, too: There are built-in rules for creating MLA, The Chicago Manual of Style, and APA style output. You can change these rules at any point and all references automatically transform. There are direct links to online reference databases, as well.

In fact, Word now has many seamless, online links. Highlight a word and choose Look Up from the pop-up menu to make the Research pane appear on the left side of the window (again, this feature makes good use of new widescreen monitors). From this, sources such as Encarta (and others) display definitions, synonyms and antonyms, and even translations into French, Spanish, and other languages. (For additional languages, you'll have to add an additional multilingual pack.)

There are several improvements in Office 2007 geared toward business users, as well. There are many professional-looking style sheets that allow for easy professional formatting with almost no effort; ditto for improved collaboration tools, such as group markups and revisions. Document comparison is especially nice because it uses a three-pane workflow that includes the original document, the new document, and the differences, which are all very easy to read. Also, there's the new Document Inspector, which reliably strips out any potentially embarrassing metadata such as the author's name and comments.

There are too many other noteworthy additions to Word to mention here, but suffice it to say that it seems some serious thought went into them with this version of Office. Also, Office 2007's new interface makes finding all of those oldie but goodie features a snap.

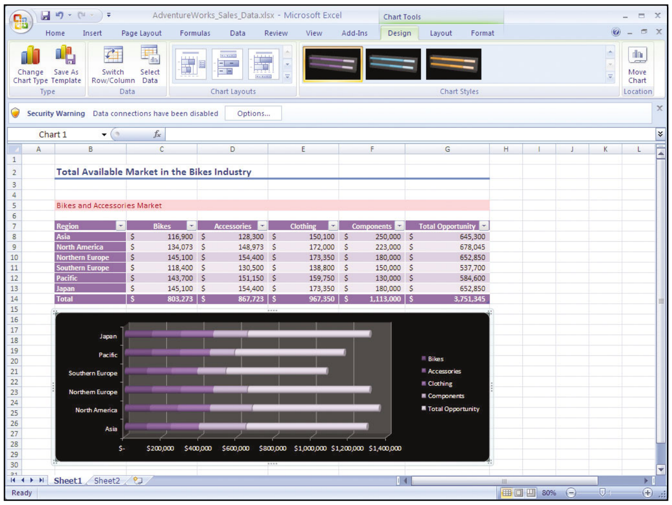
Excel 2007

One of the purported goals of the Office 2007 team was to build what it called "business intelligence" into its products, especially Excel. The idea was to provide tools and options that make it easier for users to be able to draw intelligent conclusions and take intelligent actions from the mountains of data existing files contain. In many areas of Excel, the team was right on target.

One such set of improvements is Conditional Formatting, which is one of those "why didn't I think of that?" ideas. Basically, Excel 2007 can alter the formatting of a cell based on the value within it,

Microsoft Office 2007 Packages

	Individual Program Price: Retail/Upgrade	Office Basic 2007	Office Home And Student 2007	Office Standard 2007	Office Small Business 2007	Office Professional 2007
MSRP/Upgrade		OEM Only	$149/NA	$399/$239	$449/$279	$499/$329
Access 2007	$229/$109.95					x
Accounting Express 2007	Free For Download				x	x
Communicator 2007	Volume Only					
Excel 2007	$229/$109.95	x	x	x	x	x
Groove 2007	$229/N/A					
Infopath 2007	$199/N/A					
OneNote 2007	$99.95/$79.95		x			
Outlook 2007	$109.95/N/A	x		x		
Outlook 2007 With Business Contact Manager	Volume Only				x	x
PowerPoint 2007	$229/$109.95		x	x	x	x
Publisher 2007	$169.95/$99.95				x	x
Word 2007	$229/$109.95	x	x	x	x	x



Security Warning Data connections have been disabled Options...

Total Available Market in the Bikes Industry

Bikes and Accessories Market

Region	Bikes	Accessories	Clothing	Components	Total Opportunity
Asia	$ 116,900	$ 128,300	$ 150,100	$ 250,000	$ 645,300
North America	$ 134,073	$ 148,973	$ 172,000	$ 223,000	$ 678,045
Northern Europe	$ 145,100	$ 154,400	$ 173,350	$ 180,000	$ 652,850
Southern Europe	$ 118,400	$ 130,500	$ 138,800	$ 150,000	$ 537,700
Pacific	$ 143,700	$ 151,150	$ 159,750	$ 130,000	$ 584,600
Japan	$ 145,100	$ 154,400	$ 173,350	$ 180,000	$ 652,850
Total	$ 803,273	$ 867,723	$ 967,350	$ 1,113,000	$ 3,751,345

Putting together a flashy table in Excel 2007 is easy with the new table and chart formatting features. The color options in Excel will make your data jump off the spreadsheet.

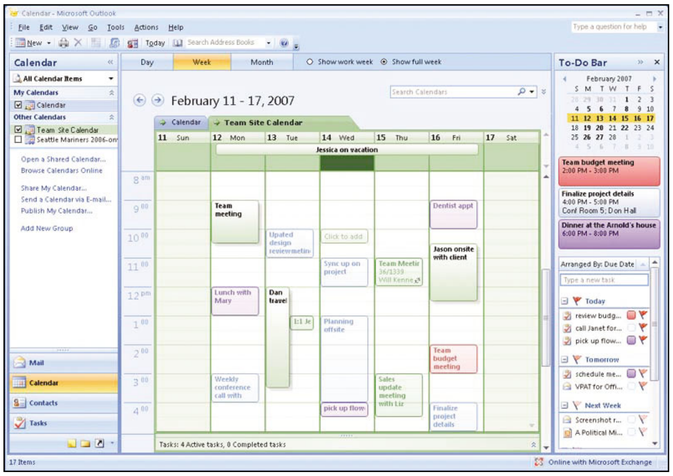
altering either the cell color (called Color Scales; adding a gradient fill to the cell's background) or adding an icon (called Icon Sets). For example, imagine a column of numbers with values between 1 and 100; Excel can easily mark cells with values between 90 and 100 in bright green, between 70 and 89 in a pale green, between 40 and 69 in pink, and below 40 in red. Also, Excel can display small icons in the cells, such as red and green stoplights, or use in-cell, gradient-based bar graphs. Streamlined dialog boxes and wizards make setting it all up a breeze and, in turn, help patterns in numerical data really jump out on the page.

Another great feature is the new Page Layout view. You probably don't print all of your spreadsheets, but for those that you do want to print, the Page Layout view displays your files with rulers, indentation, and other "paper" cues, making managing large files simpler. Speaking of large files, Excel now supports up to 1,048,576 rows and 16,384 columns in a single worksheet.

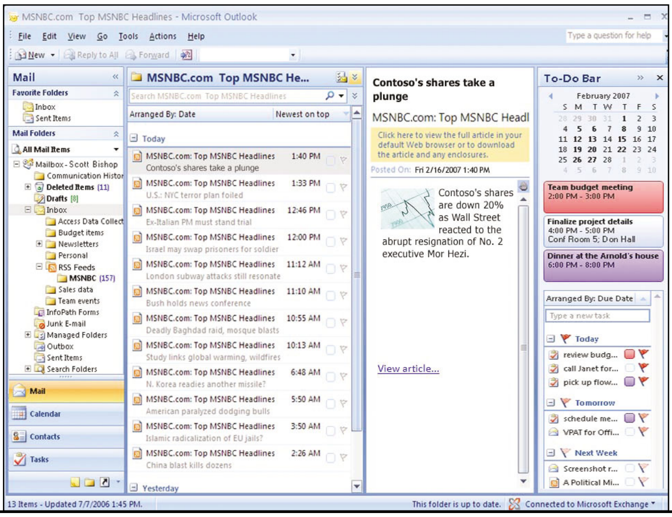
Even though there are many smaller improvements in areas such as PivotTables (choosing attractive table styles) and CUBE functions (importing data from external sources such as SQL Server Analysis Services), Excel 2007's new graphing and charting engine is likely to impress. The old charts such as pie and bar are still there, but Excel now renders them with attractive gradients and transparencies using modern color schemes.

Outlook 2007

Outlook benefits from what seems only to be a minor revision. But, new color palettes, which look especially good in calendars, make Outlook 2007 look and feel fresh.



This is a basic example of the new, colorful Calendar in Outlook 2007.



MSNBC.com: Top MSNBC Headlines 1:40 PM
Contoso's shares take a plunge

MSNBC.com: Top MSNBC Headlines 1:33 PM
U.S.: NYC terror plan foiled

MSNBC.com: Top MSNBC Headlines 12:46 PM
Ex-Italian PM must stand trial

MSNBC.com: Top MSNBC Headlines 12:00 PM
Israel may swap prisoners for soldier

MSNBC.com: Top MSNBC Headlines 11:12 AM
London subway attacks still resonate

MSNBC.com: Top MSNBC Headlines 11:10 AM
Bush holds news conference

MSNBC.com: Top MSNBC Headlines 10:55 AM
Deadly Baghdad raid, mosque blasts

MSNBC.com: Top MSNBC Headlines 10:13 AM
Study links global warming, wildfires

MSNBC.com: Top MSNBC Headlines 6:48 AM
N. Korea readies another missile?

MSNBC.com: Top MSNBC Headlines 5:50 AM
American paralyzed dodging bulls

MSNBC.com: Top MSNBC Headlines 3:50 AM
Islamic radicalization of EU jails?

MSNBC.com: Top MSNBC Headlines 2:26 AM
China blast kills dozens

Contoso's shares take a plunge

MSNBC.com: Top MSNBC Headl

Click here to view the full article in your default Web browser or to download the article and any enclosures.

Posted On: Fri 2/16/2007 1:40 PM

Contoso's shares are down 20% as Wall Street reacted to the abrupt resignation of No. 2 executive Mor Hezi.

View article...

New to Outlook 2007 is the RSS reader that fully integrates with your email.

	Office Ultimate 2007	Office Professional Plus 2007	Office Enterprise 2007
	$679/$539	Volume Only	Volume Only
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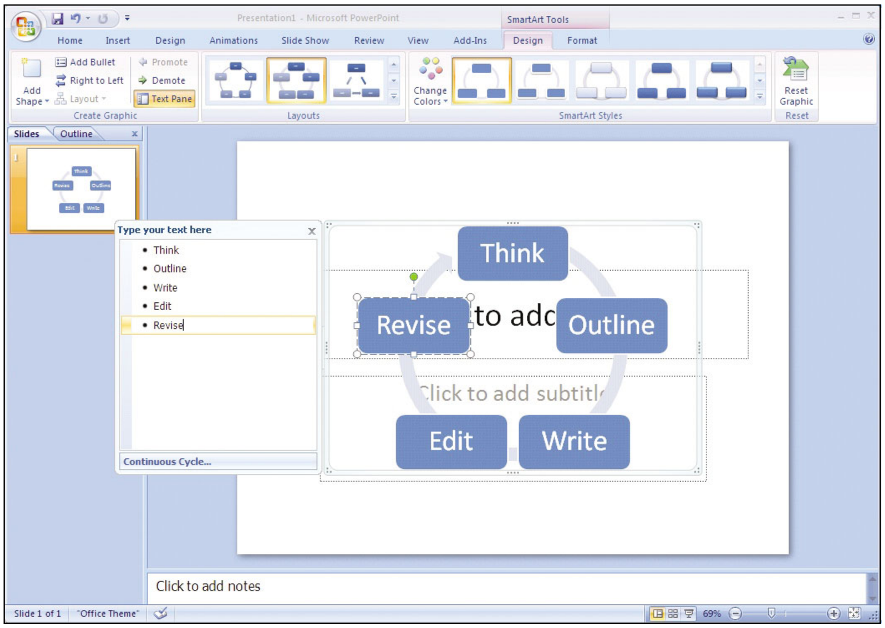

SmartArt is available to most Office apps, but PowerPoint makes the best use of it.

The "traditional" menu and toolbars interface still lives on in Outlook 2007 (even though the Ribbon appears when creating new emails and elsewhere), but Microsoft does add new features to the software. One great feature is the To-Do Bar, which is simply another vertical pane on the right side of the window that integrates appointment, tasks, and calendar items. Another new feature is Outlook 2007's RSS reader that's fully integrated with email. Adding new feeds without using IE7 was something of a trial for me, but otherwise the reader worked extremely well. Next is a real-time Instant Search function that locates all things Outlook, including emails, tasks, appointments, and even RSS feeds. Finally, Outlook supports multiple calendars, making it relatively simple to coordinate different schedules.

PowerPoint 2007

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The Other Office Tools

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Publisher 2007 is geared toward users who find QuarkXPress and Adobe's InDesign and FrameMaker too complex or too art-centric and Word too simplistic. Adobe PageMaker is probably the most comparable alternative to Publisher, but Adobe's apparent abandonment of PageMaker opens the door for Microsoft. Publisher 2007 eases direct access to data found in other Office files and can now finally convert publications to PDF or XPS (with an optional free downloadable module) and save publications as color-separated PostScript files, so getting professional printouts is simpler.

Accounting Express 2007 is bundled with some Office 2007 packages, but it is available as a free download for any Office 2007 user. Essentially an accounting package for a home-based, online, or small business, Accounting Express is best for those interested in a QuickBooks-like package without all the bells and whistles.

OneNote 2007 is a free-form, note-taking program ideally suited for Tablet PCs. With it you can combine typed/handwritten notes with images, Web clips, and audio/video clips. You can store files within a "notebook" metaphor and search everything (including text within photos) with OneNote, as well. OneNote is rapidly becoming the default note taker in university classrooms, and, as a result, the latest version has enhanced file sharing and combination abilities.

Finally, Groove 2007 creates collaborative workspaces for groups of widely dispersed users. Once set up, all members of a workgroup have access to bundles of Office files that they can edit, mark up, and save. Basic user and rights management round out the package, which runs decently—even over a dial-up connection. This may be the killer app for teams of mobile freelancers. ▲

by Warren Ernst

“Why is Antec The Power of Me?”

I want a case that's “Cool” & quiet If it's an Antec, I will buy it!

When I need a product, Antec's first on my mind,
so I hop on their website to see what I'll find.
I love Antec's innovation, rubber grommets stop vibration.
Give me silent operation, choice of the new generation.
Antec is the brand for me, I love my Antec, can't you see?

Tom Swegle
Tucson, AZ

Fusion

Antec's Quiet Computing™ solutions may not send all of you into poetic rhapsody like Tom. Hearing yourself think might tempt you to try. Find out more at **www.antec.com**.

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BEST BUY · COMPUSA WHERE AMERICA BUYS TECHNOLOGY · circuit city · J&R · MICRO CENTER THE COMPUTER DEPARTMENT STORE · STAPLES · Fry's Electronics · Outpost.com · amazon.com · buy.com · newegg.com

PDF Creation Tools

You Get What You Pay For

There's little question that Adobe's PDF format has become *the* way to deliver electronic documents across multiple platforms and devices. If anyone wants to read a PDF, they can download either Adobe's Acrobat Reader or any one of the many freeware PDF-reading utilities that run on just about every platform and operating system out there.

But what if you want to *create* PDFs? For a long time, the only way to create a PDF was to pay Adobe a hefty amount of money for the full version of Acrobat. Now, however, many programs export natively to PDF, and standalone PDF creation programs are available for very little cost or sometimes even free. Many of them sport as robust a set of features as Acrobat itself.

In this roundup, I reviewed five standalone PDF creation products: Adobe Acrobat 8.0 Professional and four addition-al products with widely varying costs and features. In almost every case, these products let you produce basic PDFs for free or at a low cost from any program that can print; the more advanced features typically cost more depending on the program's licensing and ambitions.

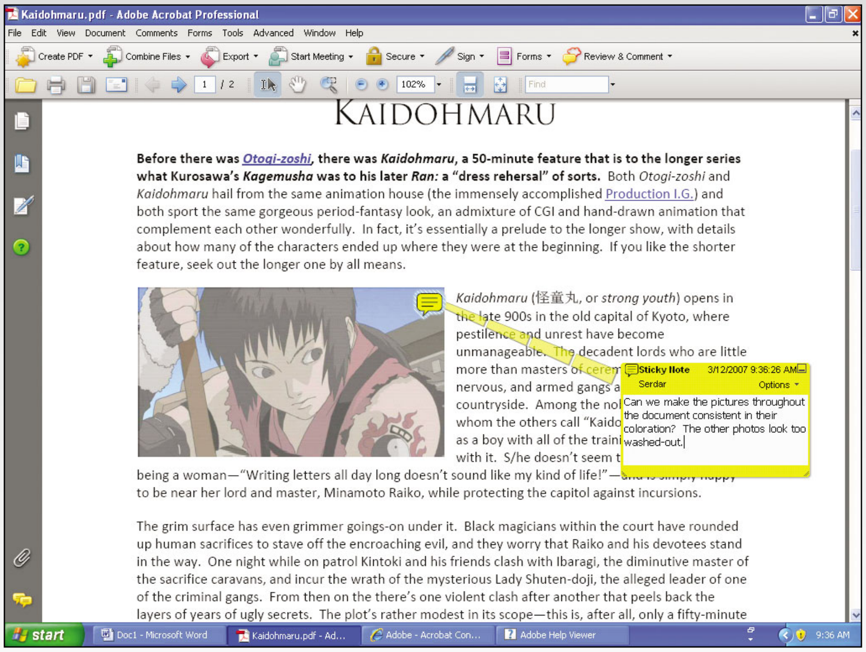
(*NOTE: A suite I looked at but couldn't include in this roundup was Nitro PDF [www.nitropdf.com]. The developer, Arts PDF, is re-releasing Nitro in a new 5.0 version, which was missing some crucial features at press time.*)

Adobe Acrobat 8 Professional

As the first PDF creation package, many programs that followed Adobe Acrobat copied some aspect of its behavior and/or workflow. Today, the biggest reason to buy Acrobat 8 Professional over competing products is for the features that are only available in Adobe's software, including the forms creation and processing functions, the prepress features, the collaboration functionality, or some combination of them.

Adobe divides A8P's main interface into eight basic functions: create a PDF from an existing file; combine PDFs; export PDFs to other formats; add security, digital signatures, and comments to PDFs; manage forms; and work with other people through Acrobat Connect, Adobe's online collaboration/Web conferencing system (available separately for $39 per month). The right function is never very far away, and each subdivision of the program has a wizard-like Getting Started pane that makes it a lot easier to understand what's involved.

When you want to convert a third-party document type (for instance, a Word document as opposed to just raw PostScript) into a PDF, A8P launches the host application for the document, prints to PDF from it, and then brings up the results for editing. You can convert many common document types, such as Office 2000 through 2003, AutoCAD 2004 to 2007, Lotus Notes 6.0 to 7.0, and more to PDF this way. If you have one of the application types A8P supports already installed on your computer you can choose to install toolbars in these applications to allow direct export to PDF with several application-specific extras. (In the Word toolbar, for



KAIDOHMARU

Before there was *Otogi-zoshi*, there was *Kaidohmaru*, a 50-minute feature that is to the longer series what Kurosawa's *Kagemusha* was to his later *Ran:* a "dress rehersal" of sorts. Both *Otogi-zoshi* and *Kaidohmaru* hail from the same animation house (the immensely accomplished Production I.G.) and both sport the same gorgeous period-fantasy look, an admixture of CGI and hand-drawn animation that complement each other wonderfully. In fact, it's essentially a prelude to the longer show, with details about how many of the characters ended up where they were at the beginning. If you like the shorter feature, seek out the longer one by all means.

Kaidohmaru (怪童丸, or *strong youth*) opens in the late 900s in the old capital of Kyoto, where pestilence and unrest have become unmanageable. The decadent lords who are little more than masters of cerem nervous, and armed gangs a countryside. Among the nol whom the others call "Kaido as a boy with all of the traini with it. S/he doesn't seem t being a woman—"Writing letters all day long doesn't sound like my kind of life!"— to be near her lord and master, Minamoto Raiko, while protecting the capitol against incursions.

Can we make the pictures throughout the document consistent in their coloration? The other photos look too washed-out.

The grim surface has even grimmer goings-on under it. Black magicians within the court have rounded up human sacrifices to stave off the encroaching evil, and they worry that Raiko and his devotees stand in the way. One night while on patrol Kintoki and his friends clash with Ibaragi, the diminutive master of the sacrifice caravans, and incur the wrath of the mysterious Lady Shuten-doji, the alleged leader of one of the criminal gangs. From then on the there's one violent clash after another that peels back the layers of years of ugly secrets. The plot's rather modest in its scope—this is, after all, only a fifty-minute

Acrobat 8 Professional's everything-on-the-menus interface makes it easy to find anything you need to create, mark up, sign, encrypt, and publish PDFs with a full range of professional-level features.

Acrobat 8 Professional
$449 (Upgrade: $159)
Adobe
www.adobe.com/products/acrobatpro
●●●●◖

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT example, you can perform a mail merge directly to PDF.) And, of course, you can always just print directly to PDF from within any application. To that end, you can usually change the settings for the PDF printer driver through the host application that does the printing. (In Word, for instance, click File, Print, and Properties to bring up the PDF driver's control menu.)

With A8P, you can create and manage printing presets for PDFs, which are a batches of settings that govern how the software distills PDFs. Adobe includes several presets by default in A8P that cover the vast majority of possible scenarios: Standard (for general-use PDFs), High Quality Print, Oversized Pages, Smallest File Size, Press Quality, CMYK (for four-color printing), and a number of draft ISO standards for document preservation.

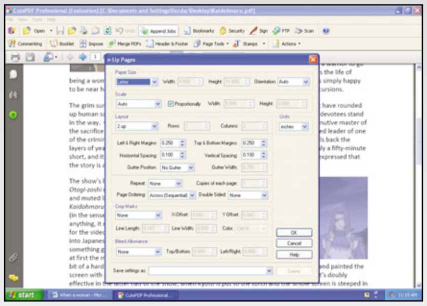
The most important features in Acrobat 8 Professional are, again, the ones that are hard to find elsewhere. One is forms creation, which wasn't available in any of the other packages I reviewed in this roundup. Another is advanced data collection using forms, meaning you can create a PDF form, distribute it, and have it automatically collate the entered data and send it back to you. One more hard-to-find feature is the Preflight function, which lets you inspect a PDF to see if it conforms to specific standards.

Versions of Acrobat with fewer features are also on the market. Acrobat 8 Standard doesn't offer form functions (authoring or automatic form-field recognition), but it has just about all of the other major features. And Acrobat 8 Elements (not available for purchase as of this writing) covers only the most basic PDF creation needs.

Acro Software CutePDF Professional 3.3

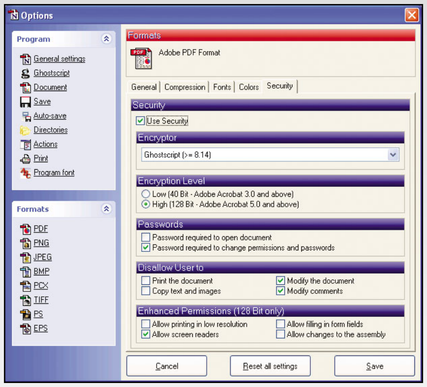
For many people, CutePDF Professional will provide a very strong, less costly alternative to the full Adobe Acrobat 8 Professional suite. It contains almost everything A8P does, except for things such as form creation and the Preflight functions. But, CutePDF does work similarly to A8P: Acro Software assembles everything you need in one place, making it easy to find. You can download a slightly limited trial version of CutePDF Pro (which places a note at the bottom of the first page of any processed document), but the print-to-PDF component of the program (CutePDF Writer) is available completely free with no restrictions.

After installing Acrobat Reader 5.0 or higher (or any other PDF viewer for that matter) and the full CutePDF Professional suite, any PDFs you render from the printer driver automatically open up in the main CutePDF application. There you can apply the full range of editing options available, from adding bookmarks and comments to creating document watermarks and custom headers and footers. CutePDF also retains a memory of all the jobs the print driver returns, so you can always go back to an earlier job's output and work with that if you want. (*NOTE: CutePDF does not actually save a rendered print job until you click Save in the program. If you print to CutePDF and then close the program, it won't save anything.*)



Among CutePDF Professional's features is its ability to condense PDFs into n-Up or booklet formats, which come with a huge range of configurable options.

CutePDF Professional 3.3
$89.95 (single license;
quantity discounts available)
Acro Software
www.cutepdf.com
● ● ● ◖



Security
☑ Use Security

Encryptor
Ghostscript (>= 8.14)

Encryption Level
○ Low (40 Bit - Adobe Acrobat 3.0 and above)
● High (128 Bit - Adobe Acrobat 5.0 and above)

Passwords
☐ Password required to open document
☑ Password required to change permissions and passwords

Disallow User to
☐ Print the document
☐ Copy text and images
☑ Modify the document
☑ Modify comments

Enhanced Permissions (128 Bit only)
☐ Allow printing in low resolution
☑ Allow screen readers
☐ Allow filling in form fields
☐ Allow changes to the assembly

PDFCreator's mix of options is impressive but hampered by its inability to save and restore document settings as profiles.

PDFCreator 0.9.3
Free
pdfforge.org
www.pdfforge.org
● ● ●

Performing simple operations on PDFs, such as adding comments or converting a PDF into a booklet, is fairly intuitive with CutePDF Professional. You can revert any mistakes with CutePDF's Undo function; plus, as I mentioned earlier, CutePDF Pro does not actually commit the changes to your document until you click Save. One CutePDF function I didn't see anywhere else except in A8P was the ability to scan documents directly into a PDF. (In CutePDF this function scans documents as images but doesn't convert them to text via OCR.) Another function I didn't see in any of the other apps in this roundup is CutePDF's ability to upload a document via FTP (you have to register the program to activate it).

One thing CutePDF could do that many other programs can do, too, is recompile PDFs into new formats such as booklet and n-Up layouts. For example, if you click Booklet, you can convert a four-page PDF into a booklet that fits on both sides of a single, folded sheet of paper. The n-Up function, for condensing multiple pages into one, is equally straightforward.

CutePDF Professional also comes with the PDF Form Filler, an auxiliary application for working with PDF forms. It's not a forms-*creation* tool, though, but one for entering data into existing PDF forms, collating the results, and importing or exporting collected form data to XML or other structured data formats. You can also "flatten" PDFs to permanently merge form data with a PDF, which is very handy if you have a given form that you are tired of filling out over and over again.

Pdfforge.org PDFCreator 0.9.3

The open-source PDFCreator is not only free of charge but also free with no strings attached. There's no for-pay, commercial implementation of the program; anyone can download it and use it, and the source code is also freely available from the creators. For a program that isn't even into its 1.x iteration yet, PDFCreator is useful enough to do production work—even if the feature mix is highly limited compared to the commercial products in this roundup.

When you install it, PDFCreator sets up a printer driver in its name, but the printer driver's internal settings don't control most of the program's default options. You can configure numerous aspects of the program's behavior (such as document encryption, image compression, the colorspace for the rendered job, and so on) by running a separate application named PDFCreator. Also, PDFCreator's security options are fairly robust: You can choose either 40- and 128-bit encryption for compatibility with most extant versions of Acrobat Reader, set passwords for opening and editing documents, and set most common document permissions.

Automatically, PDFCreator installs and uses its own internal version of the Ghostscript rendering engine (8.54), but you can force the program to use another copy of Ghostscript somewhere or pass custom command line parameters to the rendering engine. When you create a print job, PDFCreator can hold it in queue so that the program can combine it with other jobs to create a single document or immediately send it on for output. Also, PDFCreator doesn't just render to PDF alone, it can render output to image formats such as PNG or JPEG, multipage TIFF files, and standalone PostScript. You will need to render the majority of the supported image formats as single-page jobs, but there is also an option to split a given job across multiple files.

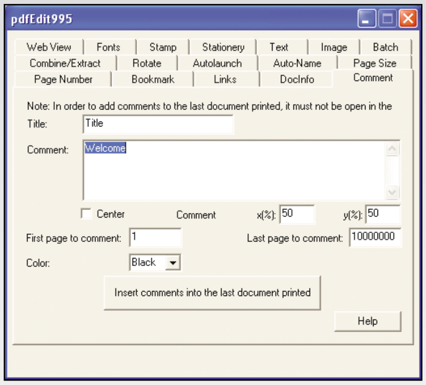
With PDFCreator, you can forward finished jobs to another printer or email them, and you can configure other custom actions to run before and after a job is complete. It's possible to watermark pages with text (for example, "SAMPLE" or "CONFIDENTIAL"), and although the documentation claims this is an experimental option, it worked fine in the same jobs I rendered with it.

One major drawback of PDFCreator is that there's no easy way to save settings into a configuration file and then reload all of them as needed. For instance, if you want to print three different jobs, you have to make *all* of the changes manually each time. This makes PDFCreator rather cumbersome if you're constantly switching among settings. There *is* a programming interface, so if you're ambitious, you could theoretically script your own support for such a thing, but, ideally, you shouldn't have to.

Software995 Pdf995Suite

The "995" in Software995's name is very suitable because many of its products cost a mere $9.95 per key. In the case of Pdf995Suite, it's $19.95 for a collection of three programs: Pdf995 for printing PDFs from any application with print support, PdfEdit995 for editing existing PDFs and creating new ones, and Signature995 for adding encryption and digital signatures. You can download and use all of Pdf995Suite's programs freely without a license key, but these versions pop up rather intrusive banner ads, so long-term users will probably want to pay up.

The virtual printer driver is the most basic component of Pdf995 and has only what few choices are available through the driver's options page; it's basically just a PostScript front end for the distillation engine. Once you've generated the PDF, you can then modify it with the PdfEdit995 program, which can also directly process Microsoft Office documents, alone or in batches, into finished PDFs. However, as with the other programs in this roundup, this only works if Microsoft Office is installed; Pdf995Suite uses the appropriate Office program to render the print job.



Note: In order to add comments to the last document printed, it must not be open in the

Title: Title

Comment: Welcome

☐ Center Comment x(%): 50 y(%): 50

First page to comment: 1 Last page to comment: 10000000

Color: Black

Pdf995Suite's price is right, but the lack of integration between the components and the fact that you can't preview your work with a given PDF makes it that much less appealing.

Pdf995Suite
$19.95 (full suite, no ads; each product, no ads, $9.95 individually)
Software995
www.pdf995.com
●●◖

The editing functions available in PdfEdit995 compare pretty favorably to what's available in the higher-end programs; for instance, an interesting feature is Stationery, which gives you the ability to create consistent letterhead, embossing, or backgrounds across multiple PDF documents. PdfEdit995 can also work explicitly with both RGB and CMYK colorspaces, making it useful for prepress work.

PdfEdit995's main drawback is the way it implements the tools themselves. Some tools work only on the last PDF you create, but some let you specify what files to do this with via a queue. This inconsistency can be frustrating. Also, there's no preview, so any changes you make to a given document PdfEdit995 applies "blindly." This is particularly irritating if you want to do things such as insert comments; for example, I had to specify a page range and an X/Y position on the page for each comment, all manually, *and* I had to insert each comment separately. Likewise, PdfEdit995 does not support digital signatures and encryption very elegantly—the software handles these features via two separate

What You Can Do With PDF Creation Software

	Acrobat 8 Professional	CutePDF Professional 3.3	PDFCreator 0.9.3	Pdf995Suite	PrimoPDF 3.0
Print to PDF	Y	Y	Y	Y	Y
Scan to PDF	Y	Y	N	N	N
Combine/stitch PDFs	Y	Y	N	Y	N
Burst PDFs apart	Y	Y	N	Y	N
Embed metadocuments	Y	Y	N	N	N
Create forms	Y	N	N	N	N
Add document signatures	Y	Y	Y	Y	N
Add document encryption	Y	Y	Y	Y	Y
Add document metadata	Y	Y	Y	Y	Y
Add comments	Y	Y	N	Y	N
Watermarking	Y	Y	Y	Y	N
Highest PDF revision supported	1.7	1.4	1.4	1.3	1.4

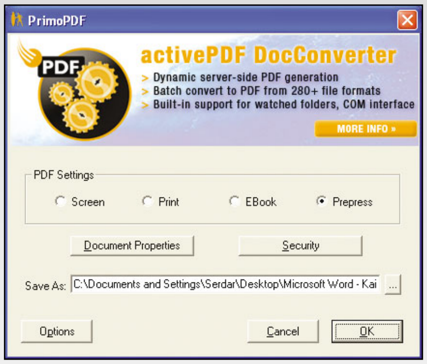
programs that you have to download and install individually.

Although there is some support for developer extensions such as scripting or automation, it's not as robust as it could be. And, Pdf995Suite doesn't offer the support to the average user in an accessible way, meaning there's no way to easily script a set of the same actions you want to apply to documents consistently. (The closest thing to this is the Stationery function, but it doesn't cover everything.) But Pdf995Suite is inexpensive, and you can at least try it out to see how well it works for you, with few strings attached.

activePDF PrimoPDF 3.0

I used PrimoPDF 3.0 and its predecessors for a long time as the PDF-creation application on my PC, although at this point it's been overshadowed by (among others) PDFCreator. PrimoPDF is the most basic of products: It's nothing more than a virtual PDF printer driver that does not have many distillation options. But, if you don't need anything more, don't want to spend a dime, and don't want to bother setting many options, PrimoPDF will probably suit you well.

PrimoPDF has the most minimal of interfaces imaginable. Once you install the program, you won't find any entries for it in the Start menu Programs listing except for the manual (in PDF format, of course) and the uninstaller. The only time you will actually see an interface for PrimoPDF is when you print from an application to the PDF driver and the job finishes spooling from the host application. At that point, PrimoPDF's main window pops up, from which you can choose the file name for the PDF you are creating, edit the document properties, change security settings, and opt for one of four possible print profiles: Screen (72dpi), Print (300dpi), Ebook (150dpi), and Prepress (300dpi and embeds all fonts).



activePDF DocConverter
> Dynamic server-side PDF generation
> Batch convert to PDF from 280+ file formats
> Built-in support for watched folders, COM interface

○ Screen ○ Print ○ EBook ● Prepress

Save As: C:\Documents and Settings\Serdar\Desktop\Microsoft Word - Kai

PrimoPDF's minimal features put as little as possible between you and the finished product, which means that much less flexibility.

PrimoPDF 3.0
Free (for personal use; enterprise/site licensing available)
activePDF
www.primopdf.com
● ●

The other options are equally simplistic: You can set the document's properties (title, author, subject, and keywords), apply passwords to prevent someone from opening the document and changing its security settings, and set permissions (allow printing/copying/commenting/editing). The only other options available (whether to open a finished PDF after completion and whether to retain security and document information settings between sessions) control the behavior of the program itself. There's literally nothing else you can do with PrimoPDF, and that includes the lack of a way to edit the properties of a finished PDF.

The closed-endedness of the program is one of its biggest frustrations. You can't edit the output profiles, for one, and you can't create new ones. It's also not clear from the documentation what the differences are, but a post on PrimoPDF's free support forum spelled out the differences (some of which I mentioned earlier). In short, it's only for those who need to produce PDFs with as little as possible between them and the end result. ▲

by Serdar Yegulalp

i-Lighter, Inc. i-Lighter

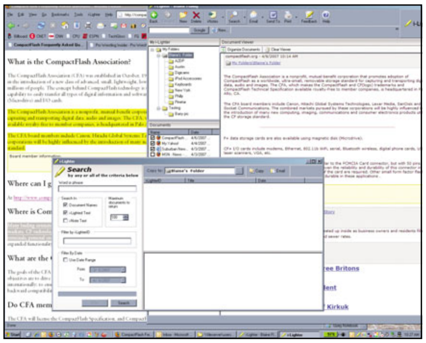
There are several reasons to stick the Windows-centric i-Lighter in your virtual backpack, including that it's free. Dubbed "the yellow marker for the Web," i-Lighter is also a great organizer. Say you're building a rig. You could use Excel charts, bookmarks, Word docs, and email to keep your online research straight, but overlap and confusion often lurks nearby. i-Lighter lets you literally mark up specific areas on Web pages—including prices, specs, and benchmarks—that you can save and access from an Explorer-like local client in folders you can make private or public.

My public searches were hit and miss. i-Lighter is still less than a year out of beta, and most of my search results returned from the same small group of users. Practically speaking, though, i-Lighter is great for tucking away things you'll know you'll want, just not now. i-Lighter fans are also praising its benefits in universities, law offices, and research facilities.

Using i-Lighter means giving up an email address to download the installation file. Once installed, you can open i-Lighter from the System Tray or toolbar in IE and Firefox. Click Start Highlighting and the mouse cursor morphs into a highlighter icon. Beyond highlighting, i-Lighter has a great notes tool for inserting comments right on Web pages—excellent for summarizing articles, noting charts, etc. i-Lighter is more one-dimensional than, say, Clipmarks and EverNote, but what it does, it does very well. There is del.icio.us support if needed, plus email, print, and blog tools.

One downside is that your data is stored on the company's servers. i-Lighter says it inserts a username in the Registry but does not use cookies or install malware. SpyBot's TeaTimer tool picked up my Registry change, but other security apps from Symantec, AVG, Trend Micro, and Zone Labs on my Windows XP Home and Pro notebook and PCs didn't fuss at i-Lighter's presence. On one hand the online approach means you can access your data from other Web-linked devices. On the other hand, i-Lighter's speed at performing even the simplest task in my tests was often frustratingly slow. Still, if your job or hobby is research-intensive, i-Lighter has great upside. ▲

by Blaine Flamig



iLighter
Free
i-Lighter, Inc.
www.i-lighter.com
●●●

DS Development Bells & Whistles For Outlook 3.0

The aptly named Bells & Whistles for Outlook users is a keeper. Although all of its tools aren't as equally beneficial, combined they flesh out Outlook very well. In particular, BW's simplistic, yet handy, Notes utility may be worth forking over nearly 30 bones for alone.

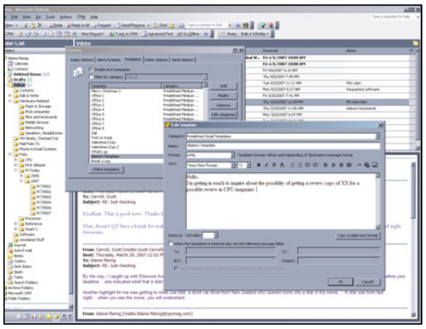
Enabled by default, Notes lets you jot down pertinent data in a sticky note-like area that's inserted straight on the message. Say you and Bill are exchanging dozens of messages concerning a project you're working on. A Note lets you insert, "Final draft due Wednesday," for example. Open the message, there's the note. Further, you can also plant a Notes column in Outlook's reading pane next to From, Subject, Receive, etc. and see the same text.

This type of common sense convenience turns up a lot in BW, which isn't too surprising considering IT and programming vets created BW. DS Development is located in Romania, and there are some definite lost-in-translation moments, but BW looks and feels like something hard-core emailers built for hard-core emailers. For example, during configuration you can set alerts for instances when you omit attachments, a Subject line, and specific addresses. You can also apply varying Reply rules to different profiles (work vs. personal); number replies; enable automatic Reply greetings; force HTML or Plain Text formats in replies; create multiple signatures; perform mail merges; and much more.

Power users will find little use for BW's 30-plus bundled templates, but creating, categorizing, and accessing your own via keyboard shortcuts and a toolbar in messages takes only minutes. Also slick is BW's Send/Resend options and Add-in Utility, which lets you enable/disable all your Outlook add-ins. Resend is a new tool in this version. It's a great time-saver; just highlight or right-click a message in the Send folder and click Send Again or Edit And Send. You can also send traffic messages to specific recipients from designated profiles and auto-attach a reply address different than the one you're sending from.

BW makes all this, plus control over 50-plus attachment extensions, available from an unobtrusive two-button toolbar. This unobtrusiveness, combined with BW's productivity-increasing tools, makes for a solid Outlook add-in that performed wonderfully for me. ▲

by Blaine Flamig



Bells & Whistles For Outlook
$29.95
DS Development
www.emailaddressmanager.com
●●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

ChemTable.com Software Reg Organizer 4.0

Because the Windows Registry is so crucial to your system's performance, you may want to look into a Registry maintenance program such as Reg Organizer 4.0. Reg Organizer is a flexible app that provides both manual editing and a simpler, automated process that lets you fix common Registry errors with just a click.

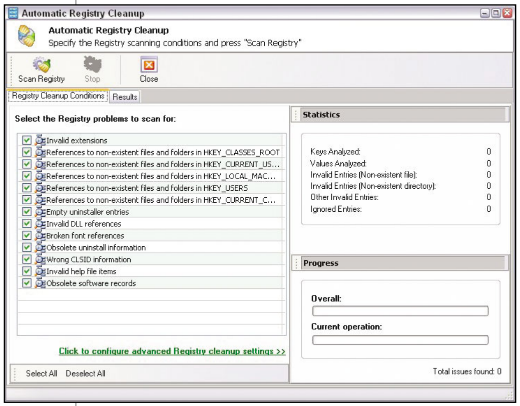
Every program dumps data into the Registry, so finding settings for individual programs can be difficult. Fortunately, Reg Organizer searches for specific program settings so you can modify or delete them without affecting other parts of the Registry.

An especially welcome feature is this app's ability to take "snapshots" of the Registry. If you take a snapshot before you install a program, you can see exactly how a newly installed program modified the Registry. If you uninstall a program, you can completely remove every trace of it from the Registry with Reg Organizer, which a normal uninstall procedure won't always do.

Not only does Reg Organizer make Registry optimization easy, it can remove stubborn entries that other Registry optimizers can't. For example, I had a particularly persistent Registry entry that two other programs failed to remove from my computer, but using Reg Organizer to remove the offending entry proved as simple as selecting it and clicking the Remove button.

There are many programs that fix and optimize the Windows Registry, but it's hard to find a single program that can do all of this easily and efficiently. If you don't already have a Registry optimizer, then Reg Organizer is crucial. If you already have one, you should to upgrade Reg Organizer 4.0 because it will probably work faster, better, and easier than your existing optimizer and offer more features. ▲

by Wallace Wang


Automatic Registry Cleanup
Scan Registry
Stop
Close
Registry Cleanup Conditions
Results
Statistics
Progress
Click to configure advanced Registry cleanup settings >>
Select All
Deselect All

Automatic Registry Cleanup
Specify the Registry scanning conditions and press "Scan Registry"

Select the Registry problems to scan for:

- ☑ Invalid extensions
- ☑ References to non-existent files and folders in HKEY_CLASSES_ROOT
- ☑ References to non-existent files and folders in HKEY_CURRENT_US...
- ☑ References to non-existent files and folders in HKEY_LOCAL_MAC...
- ☑ References to non-existent files and folders in HKEY_USERS
- ☑ References to non-existent files and folders in HKEY_CURRENT_C...
- ☑ Empty uninstaller entries
- ☑ Invalid DLL references
- ☑ Broken font references
- ☑ Obsolete uninstall information
- ☑ Wrong CLSID information
- ☑ Invalid help file items
- ☑ Obsolete software records

Keys Analyzed:	0
Values Analyzed:	0
Invalid Entries (Non-existent file):	0
Invalid Entries (Non-existent directory):	0
Other Invalid Entries:	0
Ignored Entries:	0

Overall:
Current operation:
Total issues found: 0

Reg Organizer 4.0
$39.95
ChemTable.com Software
www.chemtable.com
●●●●

Bytescout Software Development SWF Printer Pro

To share documents, you have a choice: You can either send someone a copy of the document in file form or print it out on paper. Rather than share files—and hope that the other person can open the file—or print a file on paper, Bytescout Software Development's SWF Printer Pro gives you a new option.

SWF Printer Pro installs itself as a virtual printer on your PC so you can use it to convert documents to either SWF or PDF files. This means you can view DOC, XLS, etc. files in both Flash and PDF format on any computer that can run the free Adobe Flash Player or Reader programs.

To convert your document to an SWF or PDF file, you need to click File, select Print, and then select the SWF Printer from the Print window. Next, click Print and enter a file name, pick a file format (SWF, PDF, or both), and click Save.

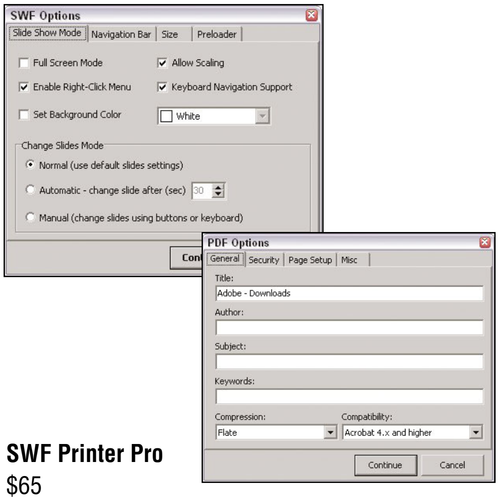
If you create a PDF file, a PDF Options window will appear. In the General tab, you can enter a title, author, subject, and keywords for your PDF file and make the file compatible with either Acrobat 4.x and higher or 5.x and higher. In the Page Setup tab, you can set the margins, paper size, and orientation of the file. You can even protect your PDF file by setting a password or using 40- or 128-bit encryption.

SWF Printer Pro will turn your file into a slideshow if you create a Flash file. First, an SWF Options window appears that lets you customize your slideshow. Click the Navigation Bar tab to add buttons that you can click to view the next slide or select the Slide Show Mode tab and click Automatic - Change Slide After (Sec) to display the slides automatically after a fixed amount of time. You can also change the background color of your slideshow and the position of the navigation bar.

I tested SWF Printer Pro by converting files from Microsoft Word, Excel, OpenOffice.org Impress, Paint Shop Pro, WordPad, and Opera, and the software worked flawlessly with all of the programs. As long as your program uses a printer, it can use SWF Printer Pro.

If you want to share files with others and need to make sure others can view them as SWF or PDF, you need SWF Printer Pro. ▲

by Wallace Wang



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Compression: Flate
Compatibility: Acrobat 4.x and higher

SWF Printer Pro
$65
Bytescout Software Development
www.bytescout.com
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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

by Chris Pirillo

A Volume Of Vista Vents

“I found your May 2007 column on Vista as more suitable for running in a virtual machine spot on. In March, I spent $6,000 on an overkill box with the best components in every category, from a QX6700 to a four-drive, RAID-5 array on an Areca 1210 controller. It’s mostly worthless while running Vista, and to get any value from my investment, I’m going to have to downgrade.”

Or so wrote *CPU* reader Jeff Woods. If you thought I was crazy for all the negative things I wrote about Windows Vista, think again. In all my years of writing for *CPU*, I don’t think I’ve ever received more feedback on any given article. Microsoft Windows hits too close to home.

Some geeks have argued that it’s the same story every time Microsoft releases a new operating system. I mostly disagree with this argument, despite its forest through the trees perspective. For one, most power users would never have wanted to spend $6,000 on an XP machine back in the day, instead, bragging about how they got away with spending six *hundred* on a fully capable PC. Furthermore, Linux and Mac OS X hadn’t matured enough to be considered as serious desktop contenders to Windows in the winter of 2001.

Microsoft may very well be living in the past, and so could its most ardent supporters.

“I had been looking to buy a laptop before Vista appeared, but all in the price range I was comfortable with had Windows Media Center 2005 OS preinstalled. I went online to customize one with WinXP Pro, but the resulting PC cost several hundred more than what I thought was reasonable.”

Or so says *CPU* reader John Tyner. And you know what? He (and everybody else) can afford to be more selective with his personal computing choices these days. I’m not going to kowtow to Ubuntu zealots or Apple whackJobs, but we’re entering an era of desktop independence, as I hinted at months ago with my column on Desktop “widgets” (or “gadgets,” if you care to apply a different marketing term to a platform-neutral application). Some of your favorite software may not run on anything other than Windows right now, but this era, much to Microsoft’s dismay, is coming to an end.

In fact, I’ve discovered amazingly better applications (in design and function) on every other operating system, including the Web. Wait, you don’t think the Internet is an OS? Well, maybe it isn’t in the traditional sense of the word, but it’s only a matter of time before that statement is seen as a given.

“I can’t agree with you more. I bought a laptop with Vista Home Premium preinstalled, and I could have sworn that when Microsoft was advertising some of the GREAT new features, one of which was that after a Windows Update you would not have to do a restart. Wrong!”

Or so claims a *CPU* reader who goes by the name “Dan.” That’s because Windows Vista is still almost fundamentally Windows NT. Yes, there’s a lot that’s changed in the past decade, but a lot really hasn’t changed. Win2000 was a step forward for the NT shell, but if you shove aside all the (questionably interesting) eye candy, Windows hasn’t really changed that much in the past few years.

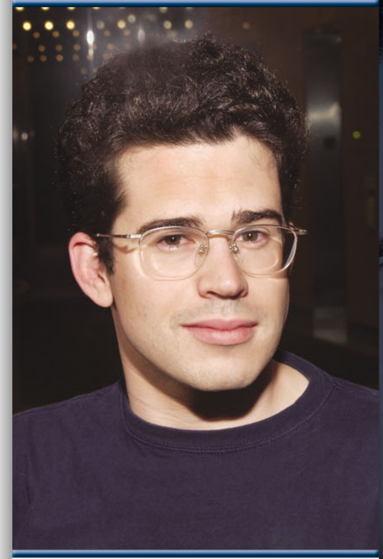
Granted, I don’t believe that any one of us would want our OS to progress too quickly and become unrecognizable with every revision. We would like to see incremental changes in our workflow and general computing environment, but I believe that change simply hasn’t come quickly enough in enough areas. Minutes before starting this article, I endured a phone call with my father, who was quite upset at Microsoft for making software that tries (and, quite often, fails) to read his mind.

As both experienced and novice users, our expectations have never been higher.

And if you thought this battle was hot, the war between traditional OEMs is burning even brighter. Can you honestly tell me the true differences between a machine from Gateway, HP, Dell, et. al.? Didn’t think so.

We’re living and computing in very interesting times. ▲

You can dialogue with Chris at chris@cpumag.com.



Chris Pirillo never sleeps. If he’s not blogging on Chris.Pirillo.com, then he’s helping people blog through Lockergnome.com—or making people laugh at bLaugh.com. Chris has an overactive imagination. You can follow his life digitally on YouTube, MySpace, Twitter, Flickr, FlibFloob, WiggiWakka, Plibbr, Smizz, FlammaJam, Schloopi, ZuumZip, Venturink, Onamonapeed, Stinkerflink, Webbrmappys, Mashstupid, SkipeGoost, Moogooggo, Voipmychest, Hypemychest, BubbleChild, and HeavySarcasm.

I’m not going to kowtow to Ubuntu zealots or Apple whackJobs, but we’re entering an era of desktop independence . . .

Open Sauce

Diary Of A Perpetually Distracted Man

by Pete Loshin

(*Editor's Note: The following material was reconstructed from the daily calendar, work log, and various scraps of paper discovered in, on, and near the writer's desk.*)

Feb 28: Finished June column, finally. Or was it May? In any case, I've only got two weeks 'til the next one is due; at least I've got a topic, "'Getting Things Done' with Open Source". Need to finish reading the book. (*Ed: You mean David Allen's book "Getting Things Done," often referred to as GTD; see* www.davidco.com.)

March 8: Work on the June column (July?). Been using a GTD adaptation of TiddlyWiki (shared.snapgrid.com) for a while now. Nice way to view, browse, navigate, and edit my "things to do" buckets in an HTML file from a Firefox tab. Personal wiki software is a nice way to go for this kind of thing. See Clint Checketts' Tiddlystyles.com for updated GTD and other style templates, though.

MonkeyGTD (monkeygtd.tiddlyspot.com) is even spiffier GTD TiddlyWiki-powered system, with a dashboard for quick overview of everything from pending items to completed items.

Finish reading GTD book.

March 9: July column almost done. Found Jeff Sandquist's GTD tools list at wiki.jeffsandquist.com—lots of good pointers. Tried PyGTD, a GTD tool written in Python (96db.com/pyGTD), a good solution for extracting tasking and prioritization from text to-do files. Todo.sh script (todotxt.com) is a command-line tool for geeky GTD implementation—very nice because very simple. Uses simple flags so you can enter, sort, and mark items complete.

March 10: Get ready for vacation (*Ed: This would be Pete's family trip, which took place the last week of March/first week in April.*). Cats, newspapers, mail, gas/lube car. Finish and submit June (July?) column. Try gtd-php—Getting Things Done with php (gtd-php.com)—but first need to make sure I have PHP, MySQL, and Apache installed and turned on.

Read GTD book.

March 19: Good thing I'm up to date on my columns (*Ed:* Sigh. *What have you been doing all month?*). Liked Phil Jones' SdiDesk (smartdisorganized.blogspot.com) stand-alone personal wiki; too bad it's Windows only; his informal/informative screencasts helped me "get" GTD.

Finish book.

March 20 : Vince (*Ed: That's me.*) sent contract for August column, guess I'm up-to-date with June *and* July [*Ed: ARRGH!!*]. Gotta try some of those paper-only GTD solutions, like the Studentl.inc weekly planner PDF (studentlinc.typepad.com/studentlinc/2007/03/introducing_the.html), they have other nice forms for meetings. Also, neat reminders of how to "do" GTD in desktop images (anabubula.com/node/22).

Send invoice to *CPU* for July (and June?) columns. (*Ed: I quit.*)

Wrap up book.

March 29: Pack. Don't forget GTD book!

April 8: Crud. Turns out Vince never got the last column; need to check out lots more open-source GTD programs, including:

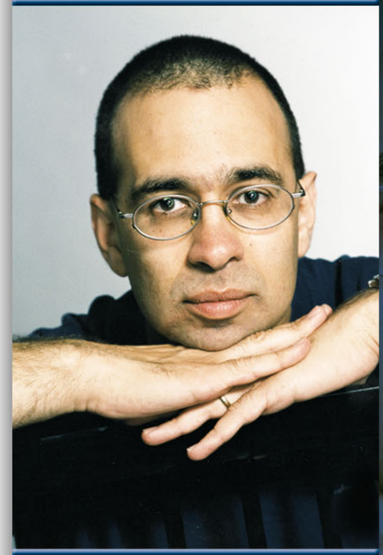
Tracks (rousette.org.uk/projects). Nice multiuser modern (it uses Ruby on Rails framework) Web app that lets you sort items by context, project, and even due dates. Includes WEBrick personal Web server and is cross-platform.

FreeMind (freemind.sourceforge.net). Java-based (thus cross-platform) mind-mapping software; handy for mapping out all the tasks and sub-tasks of your projects and keeping track of what's been done and what remains to be done.

April 12: Need to start on August column. Or is it July? Better check with Vince.

April 14: Left my copy of GTD in Maryland; get new copy and finish reading it. ▲

You can get saucy with Pete at pete@cpumag.com.



Pete Loshin, former technical editor of software reviews for Byte Magazine *(print version), consults and writes about computing and the Internet. He also runs www.linuxcookbook.com. He owns shares of both Microsoft and Red Hat and believes that Windows isn't for everyone, but neither is Linux.*

Been using a GTD adaptation of TiddlyWiki for a while now. Nice way to view, browse, navigate, and edit my "things to do" buckets in an HTML file from a Firefox tab.

Our-Fi

Municipal Wireless Searches For Its Connection

In many of our lives, broadband Internet access has become a virtual (no pun intended) necessity. But is access to the Web a public resource, such as water, heat, and electricity, something that should be readily available at a low cost to everyone? The city of Philadelphia certainly thinks so. Its Wireless Philadelphia project is a nonprofit organization that's collaborating with EarthLink to bring Wi-Fi coverage to certain public areas of the city and low-cost and subsidized access to residents. Many citizens will get modest bandwidth for as low as $21.95 per month under the plan, while lower-income families could pay less than half that rate. But Philadelphia isn't the only city looking to bring Wi-Fi to all of its residents; San Francisco, too, intends to offer free citywide access that Google and EarthLink will fund via ad support.

Although free Wi-Fi sounds like a bargain for users, for years now both the Philly and San Francisco projects have been planned but haven't actually been deployed because of ongoing controversies regarding the philosophy, technology, and business models surrounding municipal Wi-Fi. For years in Pennsylvania telcos such as Verizon aggressively opposed government involvement in wireless Internet projects, arguing that it represented unfair government competition with private ISPs. Ultimately, Wireless Philadelphia won approval, but only after the model evolved into a fee-based service in partnership with a private ISP. The San Francisco plan remains controversial across a range of political groups. Many question whether Google's targeted advertising will violate user privacy. Others oppose giving Google/EarthLink a veritable monopoly on municipal wireless services that they might be able to spin off into other businesses. Putting a city wireless plan into the hotbed of local politics and competing interests seems to have delayed some of the largest projects, which were first proposed years ago. San Franciscans continue to debate the merits of the Google/EarthLink proposal and Wireless Philadelphia is only now wrapping up "functionality tests" in a small "proof of concept" area of the city. If the muni Wi-Fi projects are way behind schedule, the technology provider for both of them, EarthLink, is not admitting to delays; "the contracts and deployment proceed on schedules we anticipated," says Cole Reinwand, VP of product strategy and marketing at EarthLink.

Why Fi?

When muni Wi-Fi first emerged in the early 2000s, many officials proposed it as a way to modernize a city—to make areas seem more hospitable to new business investment and to travelers. Making a city "wired" was emblematic of its forward-thinking culture. But as broadband has become ubiquitous in business, that argument has taken a back seat to other civic needs and policies. "There are pretty strong arguments that it democratizes the Internet," says Adrian van Haaften, VP marketing at MetroFi, which is building a network for Portland, Ore. Lower-income families remain out of the Internet loop. Many urban areas use the "digital inclusion" argument to justify governments getting in the business of wireless access.

But cities are also buying into Wi-Fi because of potential cost savings. By putting critical services onto the same wireless network that serves residents, communities hope to streamline many operations. For instance, in the Portland, Ore., rollout, MetroFi is planning on connecting the city's parking meters to a Web-based payment system. A new generation of "smart meters" will accept credit and debit cards on the spot and do all the payment and authentication over the network. Laying fiber in the ground to connect every parking meter would be ridiculously expensive, but wireless connectivity can suddenly make this and other new technologies viable.

Once a citywide wireless network is constructed, EarthLink's Reinwand argues that it can also become a source of broadband access to government offices. Although most muni Wi-Fi projects touch the citizenry through hundreds of local 802.11b/g nodes, they connect back to more robust access points mounted on

Q&A

Cole Reinwand: Un-Wiring A Major City

With municipal Wi-Fi projects already deployed in Milpitas, Calif., and New Orleans, a partnership for the Wireless Philadelphia project, and a proposal for San Francisco's network, EarthLink is one of the most active players in implementing citywide Wi-Fi. We asked Cole Reinwand, VP of product strategy and marketing, to explain the technology behind some of these projects.

***CPU:* What are the business models for most of EarthLink's rollouts? Who will bear the cost?**

Reinwand: EarthLink will build, own, and operate all the networks.

***CPU:* How do you get enough access points out there using 802.11 coverage?**

Reinwand: EarthLink will put Wi-Fi nodes on streetlight poles throughout these cities tied together into a 'mesh network' that will create a wireless broadband access network for residents, visitors, and city employees. Speeds will range up to 1Mbps upstream and downstream. Consumers connect to the Wi-Fi nodes via 802.11b/g-compatible network equipment. The Wi-Fi nodes operate in the 2.4GHz frequency.

***CPU:* How do these nodes connect to the backbone itself?**

Reinwand: Certain nodes will transmit data back to access point radio clusters located on building rooftops or existing radio towers. [They] will serve to aggregate traffic from many gateways that will be co-located with many of the Wi-Fi nodes throughout the coverage area. This is a point-to-multipoint technology in which many remote radios [gateways] are all linked back via line of sight or near line of sight connections to a central access point radio cluster located on a rooftop or tower. These radios will operate in a number of frequencies, including 5.7GHz, 5.2GHz, or 900MHz. From the access point cluster, data traffic will be backhauled to the EarthLink backbone connection using terrestrial fiber connections or via high-capacity point-to-point microwave wireless connections.

***CPU:* WiMAX seems to promise much wider coverage without all the access points. Is that a viable alternative to current technology?**

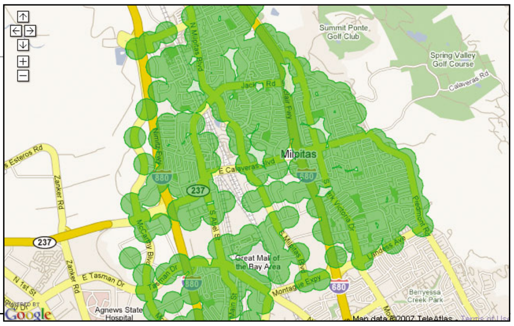
Reinwand: WiMAX and Wi-Fi are actually complementary technologies. WiMAX equipment, when available and certified sometime in the near future, can be used as a backhaul solution to carry traffic from the mesh Wi-Fi nodes to the backbone Internet connection. For the next several years, however, EarthLink believes that Wi-Fi will remain the technology of choice for consumers and municipalities due to its low cost, ease of use, and universal availability.

buildings and towers. "Not only will these access points be able to transmit traffic to the Wi-Fi nodes, but they can also provide a fixed broadband wireless connection to government offices and other businesses and institutions that might be in need of this type of solution," he says.

Wireless Waste?

But not everyone agrees with the muni Wi-Fi vision. For example, San Francisco's PRI (Pacific Research Institute) has been an outspoken opponent of city-subsidized Wi-Fi for years, and it claims in its latest research report that the few projects already active have been "disasters." Over the years, initial plans for publicly funded muni Wi-Fi evolved into partnerships with private ISPs such as EarthLink and even ad-supported solutions from companies such as MetroFi. Regardless, PRI researchers counter, many cities have floated municipal bonds or non-interest bearing loans to companies in order to underwrite these efforts. In its report of 52 existing networks, PRI argued that despite greater private industry involvement, "muni networks demand constant reinvestment. The ones in our sample have raided more than $840 million from taxpayers over 20 years. Analysis of the total track record of muni systems shows that 77% of the time they don't pay their way." When cities get in the ISP business, they undermine private enterprise, PRI says. Worse, politicians, their turf wars, and interest groups only prolong the process of getting access to the people who need it most.

Others counter PRI's claims with their own case studies of proven success. Tropos Networks, which provides the wireless

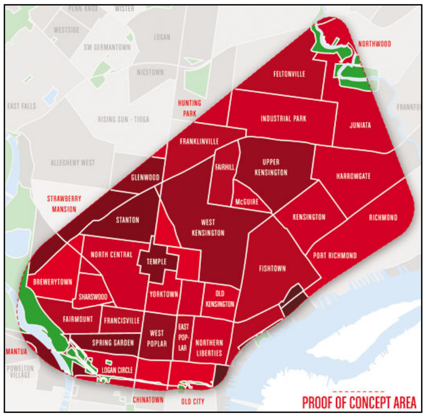


Among the more advanced municipal projects already up and running, Earthlink's citywide service in Milpitas, Calif., creates overlapping hotspots throughout the most populated areas.

mesh infrastructure for many muni systems, points to a successful project in Chaska, Minn., where citywide Wi-Fi let 28% of residents to get high-speed access for $16.99 per month and expects to break even by its fifth year of operation. Companies such as EarthLink and MetroFi say they are bearing the cost of building out these networks and financing them with low-cost subscriber fees and, in some cases, advertising. In the Portland, Ore., project, which just achieved 5% coverage of the city, MetroFi offers users two models: For $19.95, users can get speeds of 1Mbps with a 256Kbps upload channel that's best for mobile access rather than as a replacement for higher-bandwidth cable or DSL access. But users can also get a free version of the service by accepting advertising (two persistent banner promotions on the system's browser). Network providers argue that the modest speeds of the systems and the focus on outdoor and mobile usage keep muni Wi-Fi from competing directly with the incumbent ISPs. And, as far as cost to the cities, in many cases the city itself is donating only property by letting the networks put hundreds of Wi-Fi nodes and access clusters on streetlights and public buildings.

Thousands Of High Hats

Access points are what any citywide wireless network needs in abundance. "We have about 25 to 30 per square mile," says van Haaften about the build in Portland, Ore. What he calls "magicians' high hats" sit atop streetlights everywhere, but each one only provides coverage of 300 to 500 feet. A muni network requires a lot of hardware: Connecting all of these high hats is 10 gateways or broadband access points. These points use encrypted and secure wireless connections to aggregate the Wi-Fi access points and backhaul all of that traffic to the main fixed wireless hub in the city, which connects to the Internet. There will always be pockets of terrain and blind spots behind buildings that will keep citywide Wi-Fi from achieving 100% coverage, but companies such as MetroFi aim to reach 95% of a city.



In Philadelphia, the wireless project is still in its initial testing stage and just finishing trials in a small section of the city.

With so many potential users in a city accessing an 802.11b/g node at once, one would expect some slowdown, but Haaften says they have not experienced clogged networks. More than 30 simultaneous users might show some hit in service, but generally people are using public Wi-Fi for low-bandwidth operations such as quickly checking their email. Security is also a concern with public Wi-Fi. When you move a notebook from a home or office environment out into the field, generally it retains the same rules for file and drive access. In order to keep others on a public Wi-Fi network from snooping out your system, most users will have to take special care with their "share" settings.

The Wi-Fi nodes for MetroFi's public wireless network look like formal, white stovepipe hats atop streetlamps.

The biggest choke point for municipal wireless now is indoor penetration, however. "We aren't at the phase where it is truly easy to use indoors," says van Haaften. "We're still perceived as an outdoor network for sitting in the park or on the patio." Oftentimes 802.11*x* signals degrade quickly when passing through exterior walls—let alone several stories up—so any reliable indoor reception generally requires a signal booster of some sort. But this is also the weak point in public Wi-Fi that keeps these networks from being viable threats to cable and DSL providers.

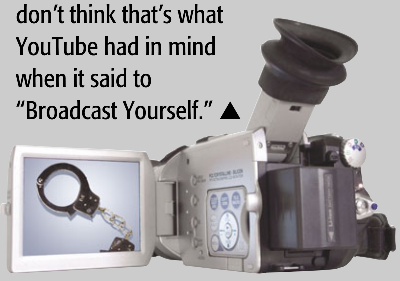
Although municipal Wi-Fi has been slow in starting, many predict that user demand will accelerate coverage quickly in the next few years. Many metropolitan areas anticipate tremendous savings in mobile phone service alone, as managers anticipate that mobile VoIP will be one of the most important uses of reliable Wi-Fi coverage. Research firm ON World interviewed hundreds of city managers recently and speculated that there could be up to 26 million paying users for municipal wireless services by 2011. CPU

by Steve Smith

Infinite Loop

Not-So-Smooth Criminals

Law enforcement officers across the country are getting a leg up on fighting crime from an unexpected source: online video-sharing and social-networking sites such as YouTube and MySpace. Several criminals have been apprehended after video of their crimes being committed turned up on these and other popular Web sites, usually by the criminals themselves. Somehow, we don't think that's what YouTube had in mind when it said to "Broadcast Yourself." ▲

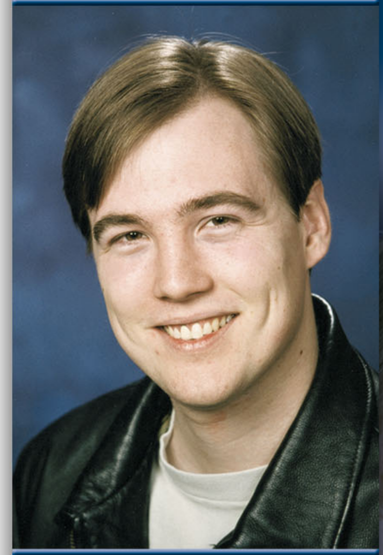


Source: www.abcnews.go.com/GMA/story?id=3010427

The Department Of Stuff

desktop.txt

by Rob “CmdrTaco” Malda



Rob "CmdrTaco" Malda is the creator and director of the popular News for Nerds Web site Slashdot.org. He spends his time fiddling with electronic gizmos, wandering the ’Net, watching anime, and trying to think of clever lies to put in his bio so that he seems cooler than he actually is.

In the late ’90s, Linux stood ready to take its place atop the pantheon of operating systems. It already had a strong position in the server market, and as the Internet rose to prominence, Unix was the de facto way for us users to send our data over the Web. Linux was the cheapest way to get Unix without shelling out massive cash for Sun hardware. Microsoft’s offerings were still a joke—well, more so anyway.

On the desktop, Linux stood similarly poised to explode into the mainstream. Red Hat, Corel, Caldera, and others raced to release better, more user-friendly versions of a Unix desktop. We saw an arms race escalate between GNOME and KDE. The rivalry between them was the stuff legends are made of. Technical debates about choice of language and programming style squared off on Usenet, Slashdot, and other mailing lists around the world.

Just as great as the technical controversies were the debates over licensing. For instance, the Qt toolkit upon which KDE was based just was not quite “free” enough for the most ardent of “free software” adherents. The war of words was epic and entertaining.

At the end of the day, in the open-source world, code talks and everything else could just shut up and sit down. As both KDE and GNOME developed rapidly, each desktop gained functionality, usability, and aesthetics that soon rivaled and occasionally surpassed everything else on the market. To be sure, there were rough edges: configuring a wireless card, lack of support for video formats, and laptop video display drivers were always a few months behind. But that was part of the fun.

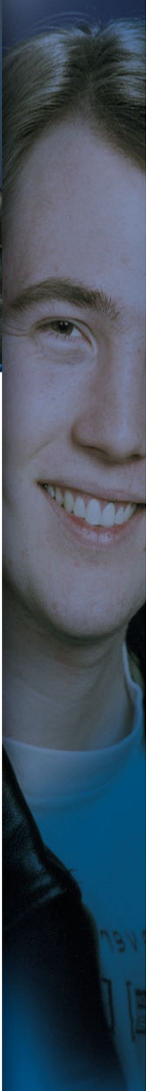
The race was on, and with each passing month, new projects would come along and fill in the gaps. We saw DVD players capable of playing discs, codecs able to decode our DIVX files, and office clones came along with the ability to import those pesky DOC files that constantly arrived in our inboxes. All of this was happening on a platform that was free, open, and provided the power under the hood for the tinkerer to go just as deep as he wanted. From changing the color of an icon to writing a Perl script to automating a system task to recompiling or even modifying a kernel, you could go as deep as you wanted without a corporation imposing any limitations. The only limit was your skills and imagination.

And then the unthinkable happened in the form of Mac OS X. Apple took what it learned from NeXT and its previous versions of the operating system and merged its sensibility for consistent user interface design with the power of the Mac BSD kernel. Soon after, a giant sucking noise was heard throughout the Internet as OS X took the wind out of the sails of the Linux desktop.

You see, Linux users fall into many groups, ranging from the idealists to the tinkerers to the pragmatists, and within a year or two of Mac OS X’s release, the PowerBook was a common sight at Linux conventions. Countless Unix developers moved to Apple hardware. Then 10.1 came out, the tools were up-to-date, and things just worked. You still had the ability to tinker around under the hood: The power of Unix was still available to the developer who wanted it, but the pragmatist still had a simple desktop that functioned neatly and efficiently. You couldn’t dig through everything, but you could dig through most of it.

In the years following, KDE and GNOME stagnated. Although the exciting groundwork had already been laid, someone else had come along and presented a spit-shined alternative for a reasonable price. What was left behind was the idealists who came more for philosophical reasons and not because they simply wanted a better computer. The war isn’t over, but the battles are different because, on many levels, Apple’s already won. ▲

Contact me at malda@cpumag.com



At the end of the day, in the open-source world, code talks and everything else could just shut up and sit down.

ROAD Warrior

by Jen Edwards

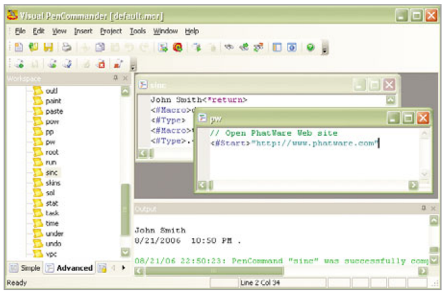
Sony Updates Digital Camera Offerings

Sony unveiled several new digital cameras at the Photo Marketing Association show in Las Vegas. The DSC-H7 ($399.99) and DSC-H9 ($479.99) fall in the prosumer category, with 8MP resolution, 15X optical zoom, and up to ISO 3200 for reduced blur and noise in digital images. Both models include new face-recognition technology, onboard editing features such as red-eye reduction and photo retouching with filters. And an advanced Sports shooting mode combines high shutter speed with "smart" continuous autofocus. Dynamic Range Optimizer adjusts exposure and color tones before JPEG compression, which could potentially reduce the amount of time spent in a PC's digital darkroom editing photos.

Perhaps the most interesting in Sony's point-and-shoot line is the DSC-G1 ($599.99), Sony's first wireless-enabled camera, which can send photos to other compatible cameras and computers via Wi-Fi. It has a 3.5-inch, 921,000-pixel LCD, a Carl Zeiss lens with 3X optical zoom, and a 6MP CCD. 2GB of internal memory will store approximately 600 high-resolution photos, and a Memory Stick Pro Duo slot further expands memory. The G1 also includes advanced photo management features, with the ability to categorize photos by event and even search for photos based on color, face, or image composition. ▲

The Sony DSC-H9 features 15x optical zoom plus new face recognition technology and light on-camera photo-editing. The DSC-G1 puts a wireless spin on point-and-shoot.

PenCommander 2.0, PhatPad 4.1 Now Available



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John Smith
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Take control of your Tablet PC with Phatware's PenCommander and write your own scripts to launch programs, insert text blocks, and more.

PhatWare, award-winning developer of the Calligrapher handwriting recognition application for Windows Mobile devices, recently updated two of its popular productivity programs.

PenCommander 2.0 ($29.95) is a scripting application for UMPCs and Tablet PCs that lets you launch applications and Web sites, insert frequently used text blocks into documents, time- and date-stamp entries, and more. PenCommander includes more than 50 PenCommand scripts, and you can create your own customized scripts with PenCommander's visual interface. A Tablet PC 2005 or Windows Vista UMPC is required; you'll also need 45MB of storage for the installation (20MB for the full installation and 25MB for temporary files during installation). The upgrade is free for licensed users, but PenCommander 1.0 users will need to request a new registration code by sending their PenCommander purchasing confirmation email to support-2@phatware.com.

PhatPad 4.1 ($39.95), compatible with Windows Mobile handhelds and Tablet PCs, is a note-taking/organization application that lets you to store up to 1,000 pages of handwritten notes, illustrations, and printed text. PhatPad can also export notes as JPEGs, email notes as attachments, and beam them between handhelds. New features in this version include 256-bit encryption, a spell checker and printing on desktop PCs, Calligrapher support, an animation module that can add animated notes or drawings to notes, horizontal and vertical autoscroll options, and a Today screen plug-in for Windows Mobile devices that lets you directly access your PhatPad notes from the main screen of your device. A free viewer application for Windows Mobile smartphones is also available. ▲

The myPower GO can free you from the constant worry of running out of power when you're on the run.

Tekkeon Powers You Up On The Go

Tekkeon's latest product is the myPower GO ($19.95), which aims to pull the plug that keeps most mobile device users close to a power socket. The compact unit measures 0.7 x 2.5 x 3.2 inches (HxWxD) and weighs 4.5 ounces with four AA batteries included. When your cell phone, iPod, PDA, or camera runs out of power and needs a quick charge, connect it to the myPower GO for up to six more hours of talk time, 1.5 hours of battery life, 20 hours of audio playback, or another 500 photos, respectively. An integrated USB port lets you recharge the AA batteries inside the myPower GO when you connect it to a computer. The myPower GO also includes necessary adapters for Blackberry, Motorola, Nokia, and Sony Ericsson phones. Additional adapters are available for separate purchase.

If you need something powerful enough to feed your laptop computer or camcorder, you might consider the myPower ALL MP3400 ($159.95). The MP3400 is a rechargeable lithium polymer battery that provides up to 3.5 amps of output current and 19 volts of power to charge even the hungriest of mobile devices. It comes with an AC adapter, leather case, and eight adapter tips that are capable of charging most laptops, cameras, phones, and portable gaming devices.

A comprehensive compatibility list at www.tekkeon.com/site/products-mypall-adapt.php shows exactly which devices the MP3400 will charge out of the box and also includes links to the appropriate adapter tips for compatible devices which are not included with the initial purchase. ▲

Kingston DataTraveler Reader Is Two Drives in One

USB flash drives are everywhere these days, so it would be easy to think there's nothing new under the sun—but you'd be wrong. Kingston introduced a clever product called the DataTraveler Reader, which is a USB flash drive that doubles as an SD card reader, giving it expandable memory capacity.

Simply place an SD, SDHC, MMC, or MMCplus card in the drive's slot, underneath a flip-up panel; smaller cards such as miniSD and microSD are also supported via an adapter. The USB drive and the memory card will show up on your computer as two separate drives, so you can easily copy and manage files.

Compatible with both Windows XP/Vista and Mac OS X, the DataTraveler Reader is currently available in 1GB and 2GB capacities; a 4GB version should be available in the second quarter. ▲

Fujitsu Introduces Three New Notebooks

The P7230 is an ultra portable computer with a 10.6-inch LED-lit WXGA display and powered by a 1.2GHz Intel Core Solo ULV processor. A built-in modular bay works with a variety of options, including DVD/CR-RW or dual-layer DVD±RW drives. You can remove the drive to reduce travel weight or insert a second battery, providing up to 9.75 hours of battery life between charges.

Bluetooth and 802.11a/b/g are built-in, as well as an internal modem and Ethernet port. A biometric fingerprint scanner for extra security is optional, and you can choose between a black or white exterior shell. Base models start at $1,649.

Although it's not as petite as the P7230, the S2210 is significantly more powerful, with a dual-core AMD Turion 64 X2 processor, 512MB of RAM, and a 40GB hard drive. The S2210 weighs about 4 pounds and has a 13.3-inch XGA display and the same modular bay as the P7230. Prices start at $1,299.

And for those in need of an even smaller computer, the P1610 Tablet PC is an excellent choice. Featuring an 8.9-inch, indoor/outdoor TFT touchscreen display, the P1610 is a convertible Tablet PC based on the same processor as the P7230. But it's much smaller, measuring only 1.36 x 9.13 x 6.57 inches (HxWxD) and weighing just 2.2 pounds with the standard 3.5-hour battery. An optional high-capacity 5200mAH battery is also available, which provides six hours of life on a single charge and adds about 0.75-inch in depth to the back of the computer. Prices start at $1,599. ▲

Fujitsu recently released a new fleet of notebooks that includes a Tablet notebook with an 8.9-inch, indoor/outdoor touchscreen.

At Your Leisure

The entertainment world, at least where it pertains to technology, morphs, twists, turns, and fires so fast it's hard to keep up. But that's exactly why we love it. For the lowdown on the latest and most interesting releases in PC entertainment, consoles, DVDs, CDs, and just leisure and lifestyle stuff we (for the most part) love and recommend, read on.

Audio Video Corner

by Blaine A. Flamig

Bright Eyes—"Cassadaga"

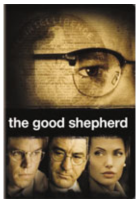
It's been since 2005 when Conor Oberst dropped two drastically different Bright Eyes albums on us in the form of the digitally drenched "Digital Ash In A Digital Urn" and the acoustically wonderful "I'm Wide Awake, It's Morning." In the interim, Oberst gave his ever-growing fan base "Noise Floor," various rarities stretching from 1998 to 2005, and "Four Winds," an EP released earlier this year. As with those releases, the generally excellent "Cassadaga" is all about Oberst's questioning, accusing, and reflecting lyrics, of which there are many to filter through. Arguably better than Oberst's lyrics on "Cassadaga" is the music Bright Eyes has fleshed way out in comparison to its past work, which was dominated by Oberst's influence. "Cassadaga," conversely, feels like something from a musically like-minded collective. A great many Bright Eyes' fans revere Oberst and will listen mostly for the words, but casual fans new to Bright Eyes are in for a complete musical treat.

$13.98
Saddle Creek Records
www.saddlecreekrecords.com

Kings Of Leon—"Because Of The Times"

Diversity is the name of the game on "Because Of The Times," the Kings' third full-length album. That's good and bad news. Good because singer Caleb Followill's lyrics and singing have matured tenfold. The bad news is that "Because Of The Times"—a nod to the ministers camp they attended as kids—is a significant departure from 2005's southern-rocking "Aha Shake Heartbreak" (still one of our favorite albums of this century). Although we're not opposed to bands exploring new ground, the territory Kings Of Leon venture into on "Because Of The Times" isn't as exciting as we'd hoped for. Fortunately, there's still enough bombastic joy on tracks such as "Knocked Up," "Charmer," and "McFearless" to keep us loyal to the Kings.

$13.98
RCA
www.kingsofleon.com



The Good Shepherd

If Robert DeNiro decides to hang up his acting hat and turn his creative attention to directing films full-time, that's fine with us. DeNiro fills *The Good Shepherd* with authenticity and a cast that's brimming with A-grade talent, including Angelina Jolie, Joe Pesci, Alec Baldwin, and William Hurt. As CIA agent Edward Wilson, however, Matt Damon is astonishingly convincing as an agent ultimately blinded by his loyalty. "Shepherd" is easily among Damon's grittiest and best work. If "The Good Shepherd" has escaped you, Eric Roth's biting screenplay is full of the kind of unexpected, deceptive twists that make great movies great.

$20
Universal Studios
www.thegoodshepherdmovie.com

Bobby

From director Emilio Estevez comes "Bobby," the fictional story of 22 people who were at the Los Angeles Ambassador Hotel the day Sirhan Sirhan assassinated U.S. Senator Robert Kennedy in 1968. Estevez attempts to use his star-studded cast to depict many of the drastically different emotions that Americans were feeling toward Kennedy, politics, the arms race, race relations, and other issues of that era, all within the confines of the hotel setting. Unfortunately, Estevez weaves in and out of so many plots lines, you often lose sight of the bigger point he's trying to convey with the film. Ultimately, "Bobby" feels convoluted and stretched way beyond its boundaries.

$28
The Weinstein Company
www.bobby-the-movie.com

DVD Byte

5/1
Dreamgirls
Little Children
Alpha Dog

5/8
Because I Said So
Catch & Release
Music & Lyrics

5/15
Pan's Labyrinth
The Fountain
Stomp The Yard

5/22
Apocalypto
Letters From Iwo Jima
Epic Movie

See the full reviews from A/V Corner at www.cpumag.com/cpujun07/AYL

COMMAND & CONQUER 3
TIBERIUM WARS

CPU
Game Of The Month

Kane Is Back *-by Dr. Malaprop*

$49.95 (PC-DVD); $59.99 (Limited Kane Edition) • ESRB: (T)een • Electronic Arts • www.commandandconquer.com

The last several months have been good to real-time strategy gamers: THQ's Company Of Heroes (reviewed in the March 2007 issue) and Supreme Commander (reviewed in May 2007)—and now EA's Command & Conquer 3: Tiberium Wars. The original Westwood Studios-crafted C&C running under DOS was excellent in 1995, its 1999 sequel less so, and the fast-paced franchise extension in 2000, C&C: Red Alert 2, top-notch.

C&C3 advances the conflict between the GDI (Global Defense Initiative) and Brotherhood Of Nod through the use of crisp, full-motion video sequences starring the likes of Tricia Helfer ("Battlestar Galactica"), Grace Park ("Battlestar Galactica"), Josh Holloway ("Lost"), Billy Dee Williams ("The Empire Strikes Back"), Michael Ironside ("Starship Troopers" and Sam Fisher from the Splinter Cell games), and of course Joe Kucan (Kane from the previous C&C games). Naturally, the hammy acting captures the spirit of the series perfectly.

The Brotherhood has been relatively quiet in the past 16 years, and arch-villain Kane presumed dead. The substance Tiberium has been spreading quickly. Red zones (30% of the world) are no longer able to sustain human life, yellow zones (50%) support life but are contaminated, and blue zones (20%) are unscarred and occupied by the GDI. A surprise nuclear strike against a GDI space station takes out key members of the leadership hierarchy early in the game, and you're called upon to act. Are you ready, Commander?

Each faction has FMV sequences to carry the story forward from each faction's points of view. The occurrences you hear about cross-reference the opposing storyline, which keeps the fiction cohesive. Upon completing both the GDI and Nod campaigns, you get a chance to play a handful of missions as a new race called the Scrin (aliens were alluded to in C&C2). The Scrin campaign is fun but seems tacked-on as a teaser for the inevitable expansion pack.

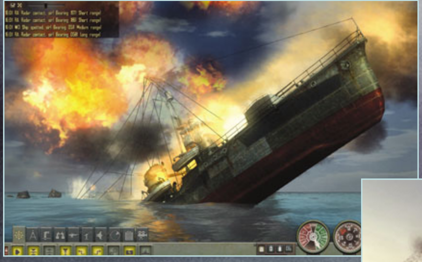
The eye-candy of firepower, explosions, and general destruction are portrayed with panache, though some close-up textures would benefit from more detail when zoomed in. Building up your tech tree is not difficult, but balancing your defensive and offensive units is vital. The GDI employs brute force, Nod focuses on stealth, and the Scrin, well, are alien and so require experimentation. Action in C&C3 is fast and furious; it harkens back to what we loved most about the style of gameplay in Red Alert 2. This means that players have to act fast and that most games (especially in multiplayer) last no more than 30 minutes. EA added a new feature called Battlecast that lets a live game have online spectators, an announcer and commentator, and even the ability for an announcer to telemark games for spectators. There's definitely a push here to make C&C3 a part of the professional gaming league. How that pans out has yet to be seen, but these features are innovative, and watching a good battle is surprisingly enjoyable.

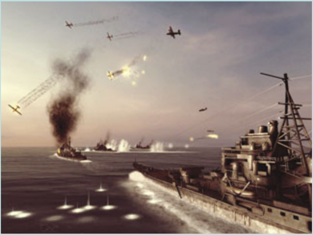
There are numerous tweaks, updates, and features, but the core design keeps this iteration closely aligned to the C&C series. Production values are fantastic and everything about the game comes off as polished. Anyone that's played the C&C series will be amply entertained by the single-player mode, skirmishes, and spectator sport-friendly multiplayer mode. Novices to the franchise will not feel limited by not having played previous games in the series. C&C3 may lack innovation, but it heaps it on where your dollar really counts most: entertainment. ▲

SILENT HUNTER
WOLVES OF THE PACIFIC

Death From The Depths *-by Dr. Malaprop*

$49.99 (PC-DVD) • ESRB: (T)een • Ubisoft Entertainment • www.silenthunter4.com





Wolves Of The Pacific is a full-blown submarine simulator that puts you in the shoes of a U.S. submarine commander on patrol in the Pacific during World War II. It's your responsibility to keep your sub and crewmembers undetected and safe as you hunt and sink enemy ships in an effort to cut off supplies to Japan. The package includes several welcome “bonus” items: WWII-era submarine DVD documentary, historical map of the Pacific theater, Naval Ship Recognition Guide, and an in-depth 100-page manual with extra reference materials.

There's obviously a lot of water in a sub sim, so the visual acuity of the ocean is important to maintaining realism. The water and effects in our screenshots do not do just justice to the in-game graphics. Ambiance in the sub works well to build a strong sense of tension as you listen to enemy ships, explosions, creaks, and more. The game is accessible to the casual sim gamer, but more seasoned players will likely feel the most satisfaction when working out the math to sink enemy ships.

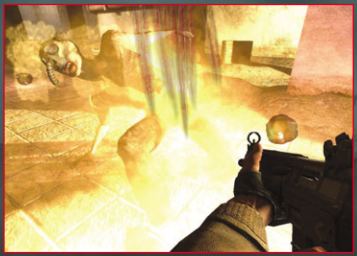
It's safe to say that submarine simulators are in short supply, which makes Wolves Of The Pacific a welcome addition. Having played MicroProse's Silent Service on the Commodore 64 in the mid-1980s, Sierra On-Line's Aces Of The Deep on Windows 95 in the mid-90s, and Ubisoft's Silent Hunter III on Windows XP in 2005 (and many in between) it's safe to say that this latest iteration does not disappoint *after* installation of the hefty 116MB v1.1 patch found at www.ubi.com/US/Downloads. The inexcusable crash bugs you'll encounter prior to patching the game will leave you poorly disposed. With the patch in place, Wolves Of The Pacific demonstrates itself as a worthy follow-up to its predecessor, which we also reviewed favorably in these pages. ▲

S.T.A.L.K.E.R.

www.stalker-game.com

From Russia With Love *-by Dr. Malaprop*

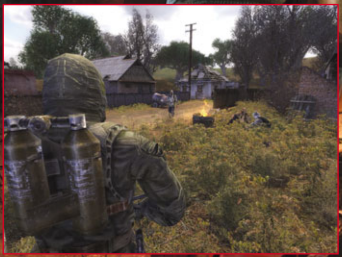
$39.99 (PC-DVD) • ESRB: (M)ature • THQ • www.stalker-game.com

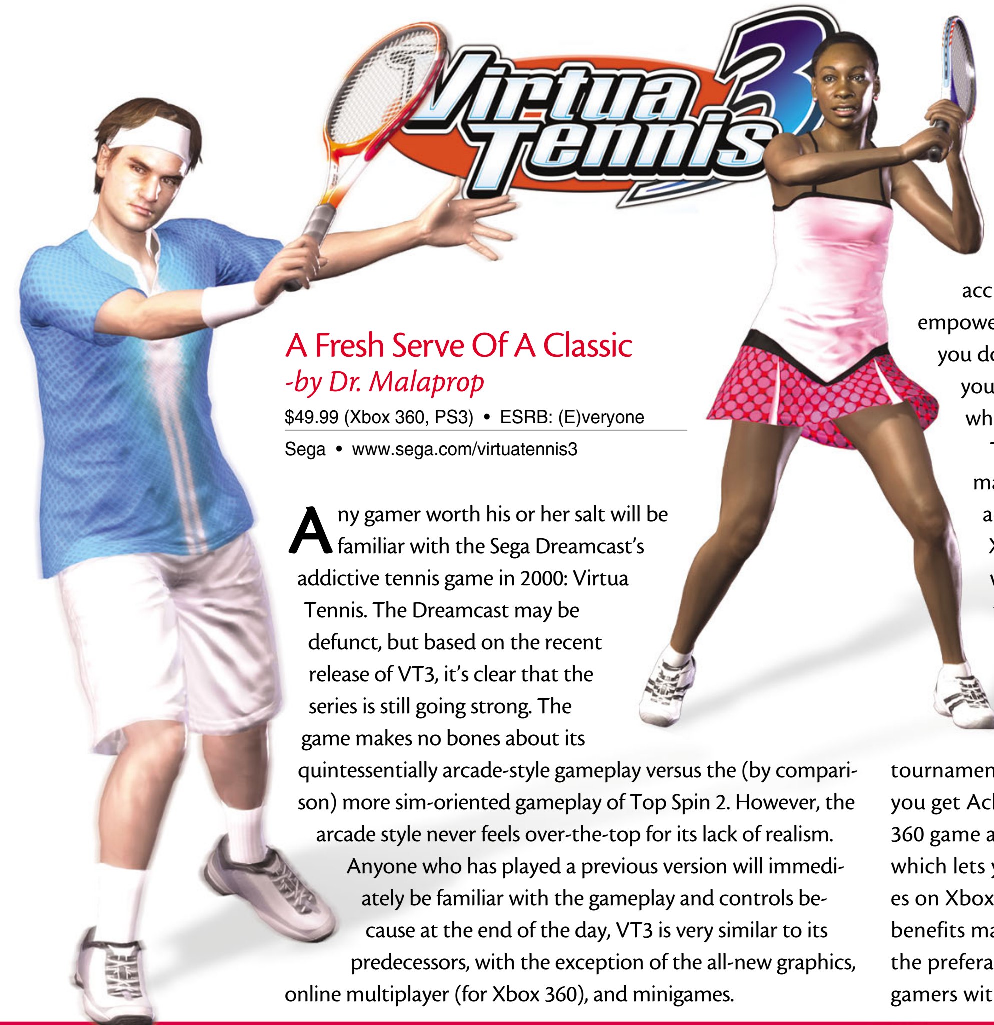


Pinch yourself. That's right, it's *that* Stalker—the one that's been in development for more than six years and that very few of us ever expected to see. What's more, it's actually rather good. The game's location is near the real-live Chernobyl nuclear power plant which in 1986 was the location of the worst nuclear accident in history. Not surprisingly, the entire surrounding area was rendered inhabitable. It's harsh and unfriendly and features all manner of unpleasant things. The in-game locations are inspired by the real locale.

You begin with almost nothing and take on more advanced missions to make money. You'll need funds, of course, to upgrade your weapons and equipment to further your agenda. You'll gain more mission opportunities as you meet new characters. Gameplay has elements of Half-Life but with broader environments and more choices. The game isn't linear and features multiple endings, which greatly increases replayability. For such a dated graphics engine, the visuals are nothing to complain about. Over the hours, you'll find yourself sucked into the atmosphere of the game, wallowing in the wonders of suspended disbelief.

Stalker has a distinct personality that's sometimes quirky but is a nice change of pace from the traditional FPS games we typically play. The environment and “living world” harkens back to the open-world stylings of Oblivion, but you'll learn that there are natural barriers to keep you in certain areas. The Zone, as it's called, is reminiscent of Oblivion because of the sheer size of the locales. This is not for the casual gamer; gameplay is challenging even at the lowest difficulty setting, but Stalker is one of the most satisfying FPS games we've played in a while. ▲





A Fresh Serve Of A Classic

-by Dr. Malaprop

$49.99 (Xbox 360, PS3) • ESRB: (E)veryone

Sega • www.sega.com/virtuatennis3

Any gamer worth his or her salt will be familiar with the Sega Dreamcast's addictive tennis game in 2000: Virtua Tennis. The Dreamcast may be defunct, but based on the recent release of VT3, it's clear that the series is still going strong. The game makes no bones about its quintessentially arcade-style gameplay versus the (by comparison) more sim-oriented gameplay of Top Spin 2. However, the arcade style never feels over-the-top for its lack of realism.

Anyone who has played a previous version will immediately be familiar with the gameplay and controls because at the end of the day, VT3 is very similar to its predecessors, with the exception of the all-new graphics, online multiplayer (for Xbox 360), and minigames.

Included are a plethora of very recognizable top-seeded male and female tennis players, including Andy Roddick, Roger Federer, Maria Sharapova, and Venus Williams. The players are all modeled accurately and animated fluidly. The included tools will empower you to create your own unique player models if you don't want to use the included pros. Along the way you'll play and unlock numerous tennis mini-games which are as addictive as the main game.

The in-game music will be grating to many, but ultimately VT3 is simple to grasp, difficult to master, addictive to play, and spectacular to watch on the Xbox 360 and PlayStation 3. The 360 version comes with an online career mode, which lets you take your custom-built single-player character into the online tournament realm. Naturally, you get Achievements with the 360 game as well as VT TV, which lets you watch live matches on Xbox Live. Together, these benefits make the 360 version the preferable one to own for gamers with both consoles. ▲

Crank It To Eleven *-by Dr. Malaprop*

$89.99 (360 with guitar); $79.99 (PS2 with guitar) • ESRB: (T)een

Activision • www.guitarherogame.com

Taking a slightly more complex Simple Simon concept and mixing it up with a white Gibson X-Plorer lookalike USB "keytar" and some jamming rock tunes has resulted in a rhythm game that lets players simulate playing in a rock band. The guitar controller features five color-coded note/chord buttons on the neck, a strum bar, and a whammy bar. There's a jack for your 360 microphone and a port for optional effects pedals.

As seen in the images here, notes matching the fret colors move down the screen. You are required to press the matching buttons while simultaneously hitting the strum bar. Hitting the right notes results in the scoring, which improves with your accuracy in playing the song. This simple concept has an end result that is surprisingly accessible and satisfying.

GH2 is superb on most counts, and the 360 version is the best so far: It features Achievements, improved (HD) graphics, more songs, and a better guitar controller. However, we do have some complaints: Overpriced Guitar Hero songs (more than $2 per tune), less compelling tracklist than the original GH, a wired guitar (wireless is the expected default on a 360), and woefully missing Xbox Live multiplayer support (the online leaderboards are a good start).

There's infinite replayability here, and here are some more bonuses: The guitar is recognized by Windows and can be mapped to play Frets On Fire (see en.wikipedia.org/wiki/Frets_on_Fire for more details), will be recognized by EA's upcoming Rock Band game, and can be used alongside another keytar so two players can rock in unison (one on lead and the other on rhythm and bass). Time to put on those leathers; Guitar Hero II is going to rock you like a hurricane. ▲

Machines That Write! Film At 11, Part 1

by Barry Brenesal

Today we'll examine the realization of an old dream, automated writing. This should not be confused with automatic writing, that craft whereby a person transmits through a literary medium the messages of your deceased Aunt Betty, urging you to buy stocks that came on the market 12 years after she died. Automated writing is very different. It's the ability to store, retrieve, edit, print, and share a document legibly in standardized script, as a single, unified, easy-to-manage process. Today we take it for granted, but dozens of past generations of writers would die for such a device. Except, of course, that they already have.

We'll approach the goal by stages. First, conception: The earliest extant record of a mechanical unit designed to automate writing comes down to us as a 1714 patent, from an engineer named Henry Mill. He clearly had our idea in mind when he perceived the need for a machine ". . . whereby all writings whatsoever may be engrossed in paper or parchment so that the said machine or method may be of great use in settlements and publick recors . . ." But to our knowledge, Mill went no further with this. Presumably the technology lagged behind the concept, as it often does.

For a physical typewriter, we have to jump ahead 115 years. It was in 1829 that a Michigan surveyor and postmaster, William Austin Burt, invented what he called a "typographer." It was roughly the size and shape of a modern-day kitchen island, and was not unlike a miniature printing press; pushing down a lever put type to paper. Burt sent his prototype to the U.S. Patent Office, where it was dutifully destroyed in a fire seven years later. Copies were made of it, however, and several currently exist.

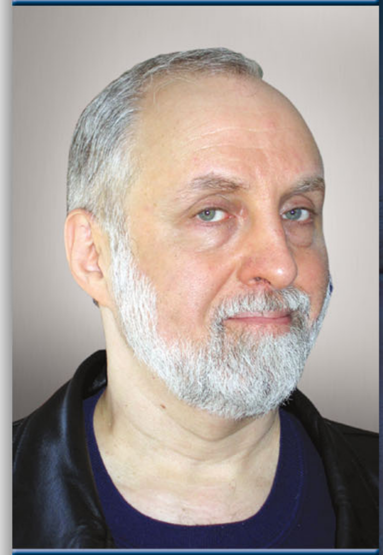
Many improved designs for typewriters followed. One in 1865, by the Danish pastor Rasmus Malling-Hansen, featured 52 keys jutting out of a brass hemisphere. The paper was curled slightly and fit beneath the ball. Called a "skrivekugle," or writing bullet, the device incorporated the good pastor's wise attempt to find the best placement of keys based on frequency of use, an ancestor of our QWERTY system. Nietzsche purchased one as he was going blind, presumably because of the print standardization that made it easy for others to read. Too bad his family didn't keep it, as surviving examples of the skrivekugle in good shape are worth $500,000 or more today.

But the first commercially viable typewriter was created by Christopher Sholes, in partnership with Carlos Glidden and Samuel Soule. It was initially designed for the task of producing consecutive numbers in a book, and Glidden is said to have asked Sholes why it couldn't also be developed to do letters. The 1874 result, called the Sholes & Glidden Type Writer, looked like a handsomely embossed ebony-colored sewing machine, and used a foot treadle to produce a carriage return. It only typed in capitals, but it worked faster than a person could write and was reasonably portable. Only 5,000 units were sold in five years, but the company that Sholes and Glidden contracted to manufacture it, the Remington firearms and sewing machine folks, went on to make a fortune from further permutations of the device.

One of the celebrated early users of various typewriters was Samuel Clemens (Mark Twain). It's difficult to tell whether his response to Remington's request for an 1875 testimonial was serious, for he responded: "I have entirely stopped using the Type-Writer, for the reason that I never could write a letter with it to anybody without receiving a request by return mail that I would not only describe the machine but state what progress I had made in using it, etc, etc. I don't like to write letters, and so I don't want people to know that I own this curiosity breeding little joker." If so, Twain's interest rekindled, because he produced the manuscript of his 1882 novel, "Life on the Mississippi," using a Remington 2.

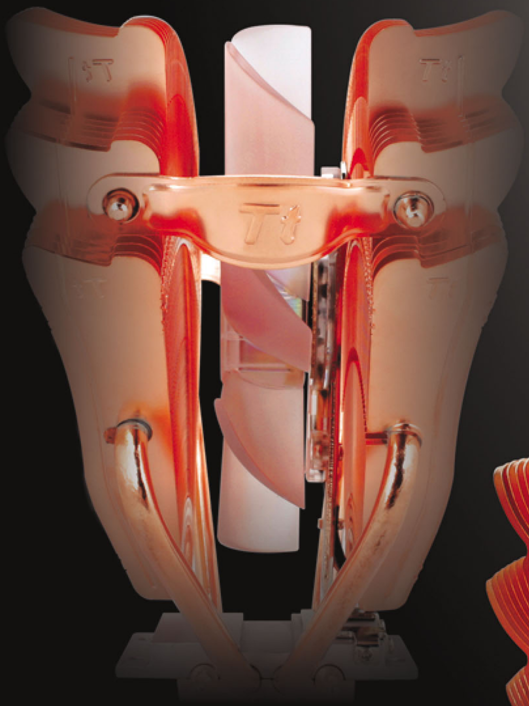
Next time around we'll witness the cutting edge of typewriter developments as we move into the 20th century. We'll also look in on a competition to decide whether memorized touch typing will win out over hunt-and-peck (no hints!) and early efforts to give electronic memory to the thing. Stay tuned . . . . ▲

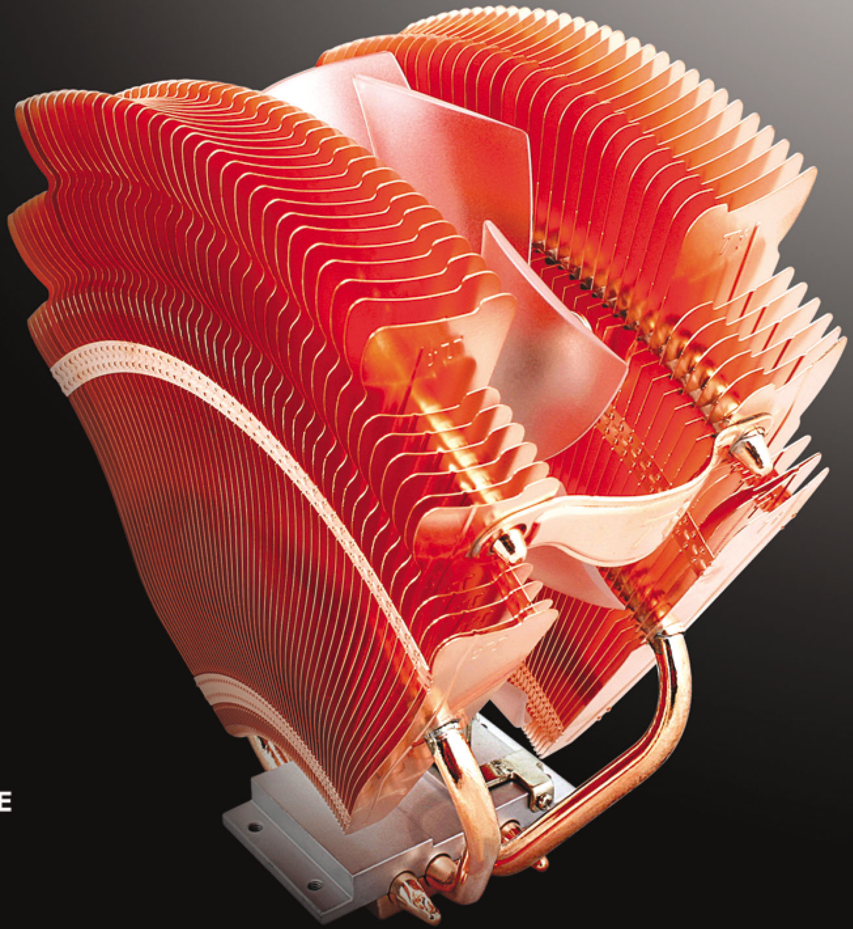
Wax nostalgic with Barry at barry@cpumag.com



Barry Brenesal has written more than 1,000 published articles and reviews on electronic technology since 1987. His first personal computer was a Radio Shack TRS-80 model 100. It was last seen functioning as a boat anchor.

Burt sent his prototype to the U.S. Patent Office, where it was dutifully destroyed in a fire seven years later.

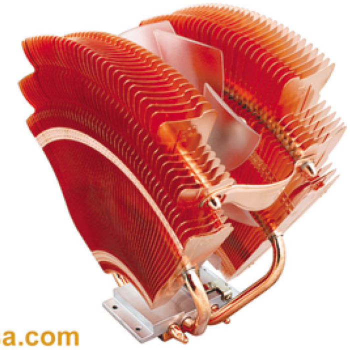




V1

ALL COPPER PERFORMANCE
EXTREMELY SILENT FAN
CONTEMPORARY DESIGN

The Thermaltake V1 cooler. Admire the slight glow it emits from the solid copper design and LED fan, this polished work of art seems like it belongs in an art museum; almost a shame for someone to not have a side window. However, don't let the elegance fool you because underneath the beauty is the cooling beast. Made from solid copper and a high performance fan with full-range speed controller, this cooler's performance is only rivaled by its style. Open-frame 14CM fan eliminates air rebounding noise that making it virtually silent during operation. Thermaltake V1, taking CPU cooling to a new height.



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COMPUSA. We got it. We get it. | RadioShack. You've got questions. We've got answers. | MICRO CENTER | Fry's Electronics Outpost.com | newegg.com | ZipZoomfly.com | TigerDirect.com | PC CLUB | Buy.com

Software Tips & Projects

Road Rules

As notebook sales eclipse desktop PC sales, many of us are juggling work across two or more computers and doing more work at remote locations. Add to that the increased power of mobile phones to access our information and the fact that we now have more ways to get the job done from multiple devices than ever before. So, in recent months we've been playing with several new (and upgraded) toys that make work on the road a lot easier. This month, we'll focus on tools for accessing data from your phone.

A few opening caveats: First, although all of the mobile tools we found are free to use, they will all incur data usage charges from your carrier and text message charges for any SMS alerts or links they require. Also, these services don't support all carriers and cell phones.

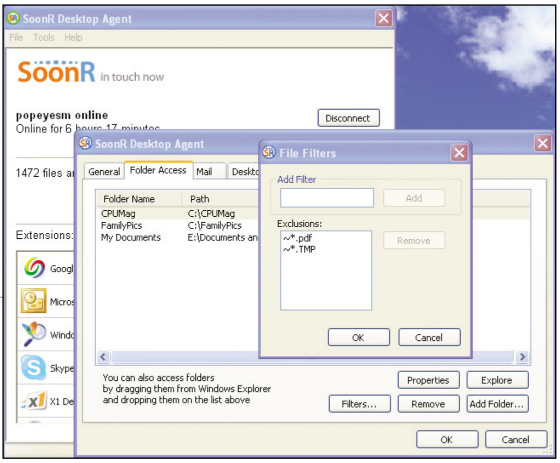
SoonR Rather Than Later

For accessing your desktop PC's email, photos, and documents on a cell phone, few programs approach SoonR (free [basic account]; www.soonr.com) for sheer convenience and power. Generally, if you have a cell phone that gets both text messaging and mobile Web access, you can use SoonR to manage your PC files from it. SoonR works much like a remote access service, except that you access your files indirectly through the SoonR WAP site.

To use SoonR, go to www.soonr.com and click Free Download. After you download SoonR, you'll have to set up an account, which includes choosing a username and password and entering your mobile phone number and an email address. If you decide to pay for the premium version of SoonR, you can then access your desktop PC files even when your PC is shut down.

We won't go through all of the steps of installation here, but make sure that once you've established your SoonR account, the service sends an SMS/WAP link to your phone with the specific URL of your personal SoonR account. Every cell phone browser is different, but generally, after you receive SoonR's text message, then use the available options in your mobile SMS reader to go to the embedded Web link. Bookmark the SoonR link in the mobile browser.

Here are a few tips for using SoonR. After you've downloaded the SoonR Desktop Agent, right-click the icon and select Settings. This is where you can control material that the client shares with the SoonR service. First, protect yourself. By default, SoonR will let you access only the folders you designate in the desktop client, but it does let you use auto-logon so you don't have to enter a password every time you log on. The service also can access any desktop search programs you have running on your machine, and *that*, in turn, can scour files anywhere on your system. This, too, is convenient, but you may want to protect that function in case your phone is lost or stolen. Click the



popeyesm online
Online for 6 hours 17 minutes
1472 files a

Folder Name	Path
CPUMag	C:\CPUMag
FamilyPics	C:\FamilyPics
My Documents	E:\Documents an

Exclusions:
~*.pdf
~*.TMP

You can also access folders by dragging them from Windows Explorer and dropping them on the list above

With SoonR you can create specific directories on your desktop available to view or forward via a mobile Web page.

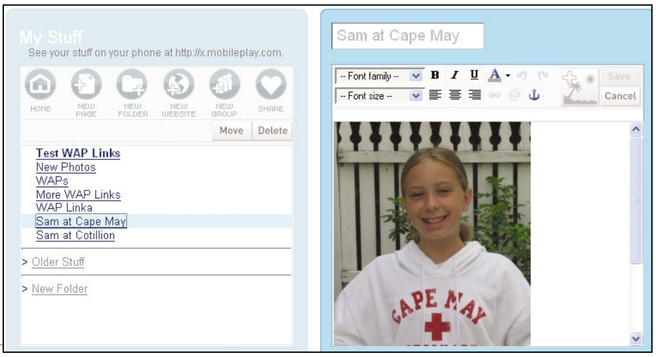
WinXP Tip Of The Month

Windows Vista often fails to discover all of the PCs on some networks, so one way to improve the interaction among your computers is to use the same workgroup name across all the nodes on your network. One of the problems is that Vista defaults to the name "WORKGROUP," and many versions of WinXP give machines the "MSHOME" name by default. To change the name in WinXP, right-click My Computer and select Properties. In the System Properties window, click the Computer Name tab to see the PC's workgroup name. To change the name, click Change and type in whatever name you've assigned to your Vista machine on the network. Reboot the computer to make the change. ▲

Registry Tweak Of The Month

Are you getting tired of seeing hundreds of "unread" email messages in the Windows XP Welcome screen? To eliminate that number, in the Registry editor go to HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\UnreadMail and click the subkey with your account's email address. In the right pane, double-click the MessageCount Value and type **0** in the Value Data field. ▲

Mobileplay's eXpress It! service lets you create personal WAP pages where you can post images and even WAP links to access yourself or to send to other mobile users.

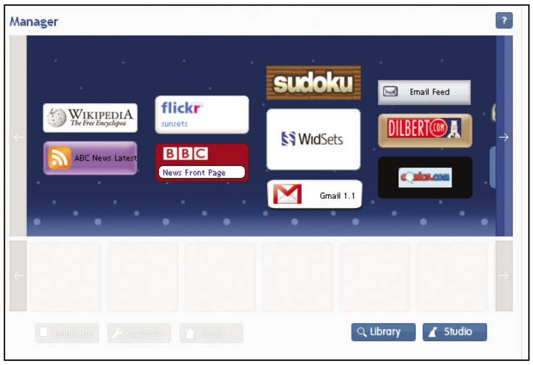


Security tab, check the Require Password For Search And Retrieval Of Non-Shared Content, and create a password. Whenever you try to use your cell to run a search on your desktop, SoonR will prompt you for the password.

Be Your Own WAP-Master

A new tool from Mobileplay (www.mobileplay.com) called eXpress It! Mobile lets you create your own mobile Web page. You can use this tool as a personal mobile portal for critical info, photos, or even mobile bookmarks.

Again, we won't walk you through the easy setup, but be aware that it does require that you register your cell phone number with Mobileplay. Although the service is free and uncluttered by advertising now, it's our understanding that Mobileplay eventually will put mobile ad banners on personal Web pages to underwrite the project.



WidSets service puts customizable widgets on your phone that can access your own collection of RSS feeds.

Once eXpress It! confirms your account and drops you into the online interface, you'll see how easy it is to construct a mobile Web page. But rather than fiddle with the online interface, there's an easy way to build a mobile Web page. If you send an email to *your cellphonenumber*@mobileplay.com, the subject line of the email becomes a new page on your mobile Web site. The contents of the email, including any attachments, will fill the new page. Mobileplay does all of the re-rendering for you. So, for instance, if you take a picture with your cell phone and email it from your phone, it will show up as a new page in your eXpress It! WAP page.

Our favorite way to use Mobileplay's email connection was to send ourselves WAP links in an email. Typing new URLs in a mobile browser is a new kind of pain, but if you list them in an email you send to your Mobileplay account, each on a separate line, they will appear on the resulting WAP page as a set of live WAP links. This way, you can maintain a set of bookmarks within your personal eXpress It! page or simply use it as a way to copy and paste these links more easily and access them from your cell phone.

Feed The Need

One final customizable mobile app is WidSets (www.widsets.com), a downloadable mobile Java app that lets you turn any RSS feed into a widget for your phone. Again, you'll have to join the WidSets service and download the Java app to your phone to use it. Within the Web-based Manager interface, click Studio to create your own widget. In the next screen, click Next under Widget Templates. After that, choose the shape and orientation you want for your mobile widget and then click Next again to choose a color. Now you'll have to name the widget and then paste in the destination URL for an RSS feed you choose. For the final box on this page, you'll need to find an image on your desktop to serve as an icon. We often use the logo from the destination site for the feed. Just right-click the logo image on a Web page, save it as an image to your PC, and then place that image in the Icon box. Click OK to finish and the widget should appear as an RSS feed on your phone the next time you log in.

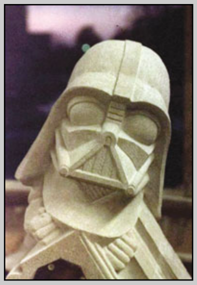
As we went to press, Google had just revised its own customizable mobile home page. Point your mobile browser to Google.com, and a link will guide you through the process of setting up a custom home page. ▲

by Steve Smith

Infinite Loop

Deliver Us From . . . Vader?

Gargoyles are common fixtures on many old-style cathedrals, but how did a gargoyle-like replica of Darth Vader end up on the Washington National Cathedral in Washington, D.C.? In the 1980s, the cathedral and *National Geographic World* magazine ran a contest in which children could design sculptures for the cathedral. Christopher Rader of Kearney, Neb., received third place for his design featuring the infamous baddie from "Star Wars." Rader's Vader joined three other winners: a raccoon, a girl with pigtails and braces, and a man with large teeth and an umbrella. ▲



Source: www.fraudwasteabuse.com/2007/03/darth-vader-is-watching-you-from-the-washington-national-cathedral.html

Warm Up To Penguins

A Sweet Vintage For Windows Programs

Even the most hardened Linux fanatics will acknowledge that there are scores of useful Windows applications that have no comparable Linux counterpart. For example, as good as GnuCash may be, it's still not in the same league as Quicken for financial management.

There are essentially three strategies for running Windows applications under Linux. The most common is to not run the applications under Linux at all. Instead, set up a dual-boot system and swap between Linux and Windows as needed. This has obvious drawbacks: It takes up excess disk space, requires a Windows license, and makes you wait every time you change between one OS and the other.

The second approach is to install virtualization software, such as VMware (www.vmware.com), and run the applications inside a virtual Windows OS running on top of the base Linux OS. This still requires a Windows license and will slow down your machine considerably as it eats up processor and memory resources. It does eliminate the inconvenience of having to keep rebooting to change from one OS to another. The Xen virtualization project (www.xensource.com) is also starting to make it possible to run Windows applications under Linux, but it's currently restricted to a very limited set of processors and motherboards.

Try The Wine

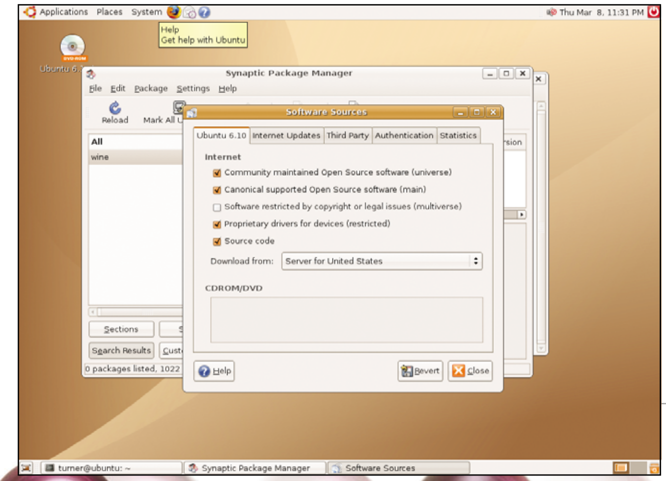
However, for Windows applications that meet certain criteria, there is a third option, which we'll discuss today: Wine (www.winehq.com). Wine is a Windows emulator for Linux. It can directly run some Windows applications with Linux without needing a virtual machine.

But right from the start, you can see that we have to attach some caveats to Wine. Because it tries to shoehorn Windows programs on top of the Linux operating system, it works better for some applications than others. A list of programs is available at appdb.winehq.org, but compatibility ultimately boils down to trying each application. For example, the current version (and several others) of the aforementioned Quicken won't install, much less run, under Wine. You'll also encounter the same problems with most programs that make heavy-duty use of a graphics card or need to interface to specialized hardware. However, for a lot of the more basic Windows programs, Wine provides a real alternative.

In this example, we'll look at how to install Wine and use it to run a shareware application. We used the latest Ubuntu distribution, 6.10, as our starting point.

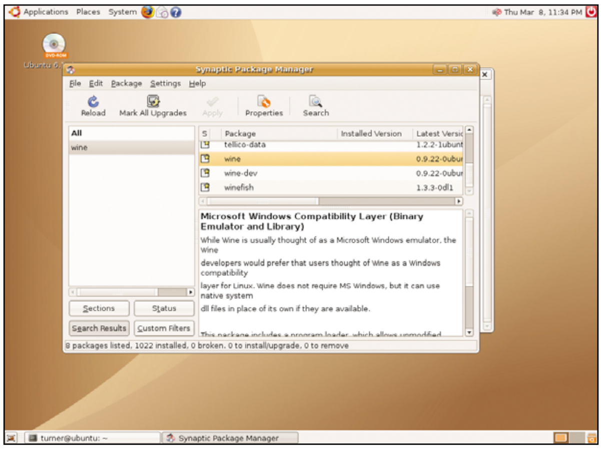
Unfortunately, Wine isn't part of the standard repositories that you can normally use to install new software on Ubuntu. Our first step was to enable the repository by clicking the System menu, pointing to Administration, and finally selecting Software Sources. We added the "universe" software repository and exited. Next, we opened Syntaptic Package Manager (also under the Administration menu), searched for Wine and requested that it be installed.

Once we installed Wine, we configured it by opening a Terminal window, typing **winecfg**, and pressing ENTER. From the configuration window, you can perform tasks such as mapping a Linux sound card to one a Windows program can use or making printers available to Wine-run applications. You can also set the version of Windows (Windows 3.1/95/98/2000/XP) that Wine will emulate when asked by applications running inside it. Wine's default settings should be adequate until you become more accustomed to it, but there's one tab that's worth discussing.



Internet
☑ Community maintained Open Source software (universe)
☑ Canonical supported Open Source software (main)
☐ Software restricted by copyright or legal issues (multiverse)
☑ Proprietary drivers for devices (restricted)
☑ Source code
Download from: Server for United States

Before you can install Wine under Ubuntu, you need to add the "universe" repository to the default list.



S	Package	Installed Version	Latest Versio
	tellico-data		1.2.2-1ubunt
	wine		0.9.22-0ubu
	wine-dev		0.9.22-0ubu
	winefish		1.3.3-0dl1

Microsoft Windows Compatibility Layer (Binary Emulator and Library)

While Wine is usually thought of as a Microsoft Windows emulator, the Wine

developers would prefer that users thought of Wine as a Windows compatibility

layer for Linux. Wine does not require MS Windows, but it can use native system

dll files in place of its own if they are available.

This package includes a program loader, which allows unmodified

8 packages listed, 1022 installed, 0 broken. 0 to install/upgrade, 0 to remove

Once you set the repository, the Synaptic Package Manager will search for and install Wine.

As initially installed, Wine uses its own version of the standard Windows DLLs to avoid any licensing issues. However, if you happen to have a valid copy of Windows and would like to use Microsoft's DLLs, you can use the Libraries tab to specify the location of those files. Before you can use the relevant DLLs, you must first copy them onto your Linux filesystem. Although a lot of applications will run under the Wine's DLLs, the Wine versions do have known deficiencies. You may find you need the Microsoft versions to get some programs running.

Install A Program

Once we exited the configuration window, we installed our first application. For our example, we downloaded a shareware Sodoku game from the Tucows (www.tucows.com) repository. After we had downloaded the package and unzipped it to our home directory, we typed **wine setup.exe** in the console and pressed ENTER.

This opened the same installation window that would have appeared if we had double-clicked the Setup.exe file in a Windows environment. Then it was merely a matter of walking through the installation screens, selecting the same default options we would have chosen if we had been installing the program under Windows. The installation program complained a few times about being unable to register libraries but otherwise ran normally.

Once we installed the Sudoku program, we used the Wine command again to run it. This can be a little tricky because we needed to determine where we had installed the program. In the home directory, there's a hidden directory called ".wine". We performed an ls on the directory to reveal a fake C: drive that winecfg had set up, with the following directories and files: dosdevices, Drive_c, System.reg, and Userdef.reg.

We were interested in drive_c, which looks like an abbreviated version of Windows' C: drive. You should find the following directories: Program Files and Windows. We drilled down through Program Files (using a graphical file explorer will help) to locate where we had installed the Sudoku game. To run the game, we used the wine command specifying the executable as if it were being run from Windows. We typed **$ wine "c:\Program Files\sudokuWP\SudokuWP.exe"** and pressed ENTER. The Sudoku game loaded in Wine as though it were running in a Windows environment.

Caveat Emptor

Now, with a successful installation under our belt, a few disclaimers are in order. The Sudoku app was, in fact, the third package we tried to use in our example. The first required Java and didn't install correctly; the second also bombed the installation. As we've already mentioned, Wine is not a foolproof technology by any means, and that includes working with relatively uncomplicated applications. You may need to experiment on your own and/or check support forums to find exactly how to get something running (if it's even possible).

There is also a commercial approach to Wine: CrossOver Linux from Codeweavers (www.codeweavers.com). Although Codeweavers' official list of applications that CrossOver Linux will support is restricted to Microsoft Office, Adobe Photoshop, Lotus Notes, Quicken, iTunes and FrameMaker, there are hundreds more that have been successfully tested. In fact, CrossOver Linux is largely an enhanced version of Wine, tuned to improve the reliability of the emulated environment. And Codeweavers provides manpower and logistical support for the Wine project.

At the end of the day, choosing how to run Windows applications with Linux will depend largely on what programs you wish to run. For absolute certainty, nothing beats a genuine copy of Windows. The next best option is running Windows as a virtual machine. Anything less is going to be a real crapshoot, so don't bet the house that a certain program will run under Wine. ▲

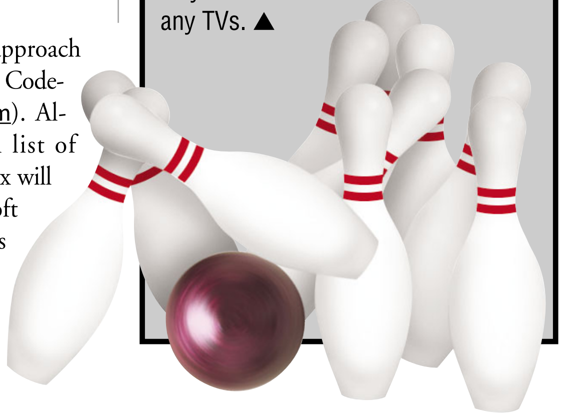
by James Turner

Infinite Loop

Wii's Universal Appeal

Nintendo may have found a way to reach an untapped gaming market. Residents of the Sedgebrook retirement home in Lincolnshire, Ill. (where the average age is 77), have adopted a new pastime: bowling with the Nintendo Wii. According to the *Chicago Tribune*, the residents, many of whom have never played a video game, find the game "addictive," and more than 20 residents signed up to compete in a recent tournament. No word on whether residents accidentally hurled the Wiimote into any TVs. ▲

Source: www.dailytech.com/article.aspx?newsid=6191



Shavings From The Rumour Mill

by Mike Magee

7-Inch Connected UMPC A PC Dream

The days of trying to understand central processing units are almost over.

We just got a whiff of Intel's latest roadmaps for this year and next, and they're so hard to understand, they make the different flavours of Microsoft Vista seem as easy to comprehend as 1-2-3 or A-B-C.

And that's the problem. Ever since the megahertz wars ended, both AMD and Intel have overcomplicated things with chips of endless variety that make things far harder to buy than they should be. The rumour mill suggests that even Intel salespeople are now the proud possessors of crib sheets to help them understand what they're selling when they're visiting customers.

Worry not. The word from the underground is that Intel and Via are now engaged in a new war, one that AMD hasn't yet entered but no doubt will.

The key to all of this is the Ultra Mobile PC, a small device that has been hailed as the answer to all of our dreams. The UMPC is purported to be a PC that does everything but is built in such a way that we'll get more than two or three hours before we have to fly around and find a friendly power point for a quick recharge.

As you can tell from the picture with this column, I am far from being a spring chicken. I got my first Toshiba notebook back in 1987 and—guess what—the battery life between then and now hasn't shown any great increase.

A brand new Lenovo X60 with all the bells and whistles that I acquired late last year advances battery life for a notebook by around 30 to 45 minutes compared with my first Tosh machine running DOS and a sprinkling of DOS-based applications.

UMPCs haven't exactly been greeted with a great deal of enthusiasm by the industry or by users, with many quite rightly thinking they're overpriced, underpowered, and underspecced. But our information suggests that's about to change, possibly as early as the second half of this year.

Somewhat surprisingly, Intel is frightened of Via and its low-power C7M device and, according to information leaked by an Asian Web site, is planning a machine code-named "McCaslin" with a 90nm processor with clock speeds of 600MHz and 800MHz. McCaslin is rumoured to only eat up 1.95 watts and have a five-hour battery life.

Other sources indicate that Via will be able to do somewhat better than this with its models. The Via reference designs will have 7-inch screens, boast longer battery life, run proper Windows, and will be able to connect not only using Wi-Fi but also be convergent with phones.

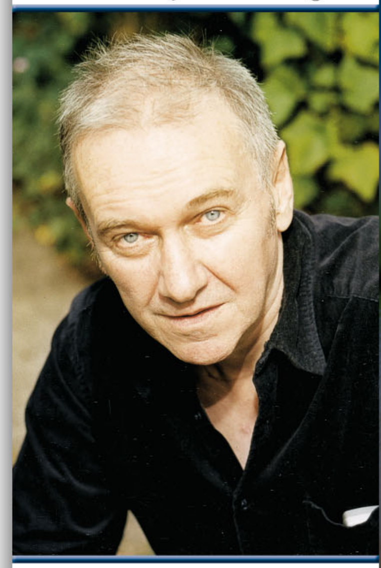
The big question here is not whether Via and Intel can make these designs, because they can, but whether the component bills are such that we'll be able to buy these machines at reasonable prices.

A light, very connectable UMPC with a 7-inch screen, some flash drive capabilities, a decent keyboard, and respectable battery life would certainly appeal to me. I've just come back from a trip to India, which has vast areas where it is impossible to connect, even with a regular mobile phone or using GPRS. Coverage in India continues to get better and even the most rural areas will have mobile coverage soon, fuelled by an incredible uptake of cheap cell phones, even for those whose incomes are absurdly low by western standards.

If the processors that power these next-generation UMPCs are only 600MHz, 800MHz, or 1GHz (in the case of Via's C7M), that won't make a great deal of difference to their functionality as long as you're not expecting to do high-end video editing and the like on your handy device.

A browser that you can use with a variety of connection standards (WiMAX, Wi-Fi, GSM, GPRS, and other protocols) won't hog too much processing power, and there will probably be no need to load fat apps like Office 2007. I'm up for a real PC that you can use practically anywhere on the planet, especially if it doesn't cost more than $500. I suspect many others would bite, too. ▲

Send rumours to "Mad Mike" Magee at mike@cpumag.com.



Mike Magee is an industry veteran. He cut his teeth on ancient products like the Dragon and the Japanese PC platforms long before the IBM-PC won. He worked for a corporate reseller in the mid-'80s and saw the Compaq 386 sandwich box and every GUI known to humankind. Mike decided that the way to go was the Interweb around 1994 after editing PC mags in the late '80s and '90s. A co-founder of The Register, Mike started the chip-driven INQUIRER (www.theinquirer.net) in 2001. He has contacts from top to bottom in the business, spanning the entire chain, who help him root out interesting rumours and speculation.

> The word from the underground is that Intel and Via are now engaged in a new war, one that AMD hasn't yet entered but no doubt will.

Wagging The Dog

Staying Afloat In A Challenging Business

by Rahul Sood

I believe there are a few core principles that a company must adopt in order to sustain a successful business while building a brand. If I had to sum up all of them up into one word, it would be "roots."

The fact is, it's not easy to go out and build a brand overnight. If you start by planting some roots and continue to feed them while adapting to changing trends, you stand a pretty good chance of survival. This requires, among other things, vision, strategy, and a team that actually believes in what you're doing. It also requires the commitment that you should not abandon your roots and start new ones somewhere along the way. Many companies in the PC gaming space started in fairly open waters in an unexplored niche, which allowed them to plant roots and grow.

History will show that companies that fail are usually ones that do not deal with change effectively. Such companies are completely oblivious to what's happening around them; they tend to be arrogant when they analyze their competition, and they all but ignore what their customers are really looking for. Some of these companies stay *too close* to their roots, and they grow on a single trajectory until they eventually end up in a tailspin and they either die a slow expected death, or they make emergency reparations (often involving the hiring of new leadership) to fix what's broken. Typically companies like these end up fragmented and disjointed.

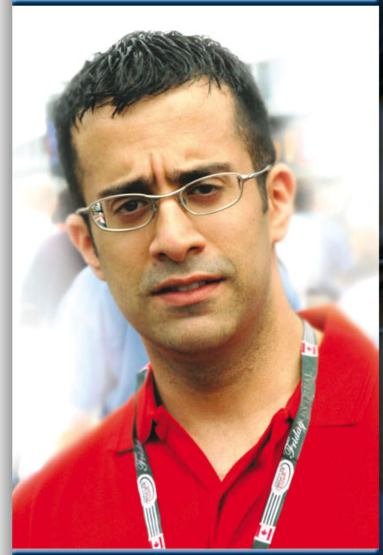
Change is usually a good thing, but when you forget your roots and plant new ones, you will most likely end up in a similarly dire situation as many who have failed before you. If you look at our industry you can easily pick out a few companies who have fallen victim to such challenges and all but destroyed their once incredibly strong brands.

Another type of company doomed to failure is the one that starts off in a race to be at the top of a niche without any fundamentals—things like history, strategy, substance, service, and the appropriate DNA. Without fundamentals you cannot establish roots, which makes it nearly impossible to survive in any market. Companies that attempt to build a luxury brand overnight are prime examples of such wrecks. They take out large ads in major magazines and ultimately they stop paying the bills, the lights go out, and it's over.

There have been many companies whose founders and investors viewed the gaming PC industry from a distance with dollar signs dancing in their eyes. Expecting a cakewalk, they ended up falling victim to their own blind arrogance. It's just not as easy as it looks, I guess. The bottom line is you cannot build a business in any niche without having both the appropriate DNA and a compelling brand. If you try, I can almost guarantee a slow but eventual death.

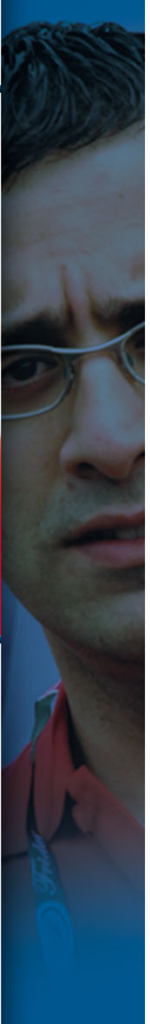
Of course, there are external forces that can have a profound effect on a company's success, too. We are starting to see the effects of mass market commoditization in the gaming space, which is making it challenging for even the longest-lived companies to survive. At one point, the gaming/enthusiast companies were looked at as potential strategic accounts for big companies because their enthusiastic customers would influence large OEMs and mainstream buying decisions. Thanks to consolidation, a quick look at the horizon shows that some big OEMs are becoming strategic monsters. We will certainly see new innovations this year that will not be as easy to replicate as a custom paint job—and this is fantastic news for consumers, by the way—because the gaming PC market has reached its saturation point and without such innovations runs the risk of getting stale.

There is little doubt that the landscape is changing. There are some exciting times ahead, and I believe we have not seen the last major events in this space, not by a long shot. ▲



Rahul Sood's love for computers started at the young age of 11. Much to the shock and dismay of his parents, he ripped apart his brand-new Apple //c and painted it red before turning it on. His parent's dreams of having a doctor for a son were shattered when college drop-out Rahul founded what is now one of the most respected high-end computer companies in the world, Voodoo Computers.

> . . . the gaming PC market has reached its saturation point and without such innovations runs the risk of getting stale.



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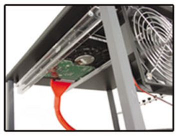

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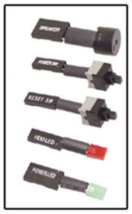

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Technically Speaking

An Interview With David J. Ernst, CIO Of California State University

David J. Ernst is the CIO and assistant vice chancellor for ITS (Information Technology Services) at California State University. He also serves as chairman of the board at the IMS Global Learning Consortium and board vice chair of CENIC (Corporation for Educational Networking Initiatives in California). Prior to joining CSU in 1995, Ernst was a senior manager in higher education for Coopers & Lybrand (now PricewaterhouseCoopers).

by Barry Brenesal

CPU: What classes of budgetary items would fall under the definition of the electronic classroom for the CSU system?

Ernst: There would be wireless and wired setups, as well as additional power outlets. It would include a projection system—in terms of the ability of faculty to project either PowerPoint or Internet images. Once the classroom is wired and wireless, it has access to everything: the campus network, the Internet, and beyond. We put a lot of additional investment in faculty training, development of courseware, and the like, which has taken advantage of the classrooms that were already electronically 'smart.' Given that there are 23 campuses, being able to accomplish that in a significant number of classrooms is a fairly large undertaking.

CPU: What type of reactions do you get from teachers who have to learn to operate an entirely new set of tools for the electronic classroom?

Ernst: Faculty could be divided into three groups: the heat-seeker group is out in front and wants to get as much of it as they can; the Luddites who don't want to have anything to do with technology; and there's a significant amount in the middle who we target the most with this training. In other words, we try to take advantage of the good work that the faculty is already doing and have the technology component of the courseware readied by non-teaching faculty who work with the teachers so that they don't have to take time out of their teaching load.

CPU: Have the Luddites become a smaller group over the years given the onslaught of new technology?

Ernst: Certainly that number has become smaller just in the years that I've been CIO and in technology. I think that there have been enough success stories to encourage change—in that the technology has gotten easier to use—and with the new faculty we have coming in, there's an expectation that these kinds of facilities are going to be available to them. That doesn't make them the heat-seekers. Their whole life doesn't revolve around teaching software, but they're expecting to have people that can work with them, that the electronics are all going to be ready, that they're coming into a university setting where the teaching technology infrastructure is in place and working. In many academic settings, ours included, you have to play catch-up to be able to deliver on their expectations.

CPU: Has possessing technological skills become something of a criterion for hiring academic staff?

Ernst: I would say that it's more a criterion that the candidate uses in determining whether he wants to come to work for the institution.

CPU: In this age of the electronic classroom, what happens to the students who are Luddites?

Ernst: I'm sure those students are out there, but we haven't encountered too many. Most of the students that are coming into CSU these days enter with a laptop and are already Internet-savvy. They don't view it as working with technology, they view it as something that was always part of their life when they were growing up and just expect it to be available.

CPU: It's a continuum that these students have lived through.

Ernst: Exactly. That's why in the same way that we try to address the new faculty needs, we address the student needs. You almost have to change your vocabulary—they're not even talking about a laptop anymore because the devices that students are using range from things like iPods to phones. They expect that they are going to be able to get access to information and images and music through multiple means; and some of it may have to do with laptops and a lot of it may not.

CPU: Is there a downside to concentrating so heavily on modern technology in teaching?

Ernst: The only downside that I've seen is where we don't do a good enough job of demonstrating to faculty that the technology is only going to be as good as the faculty is to begin with. Meaning that the technology is there to enhance the experience for the student, and, hopefully, for the faculty member—but it's certainly not there to replace them. We have this old saying, 'distance learning begins in the third row,' which means that teaching with technology is not about teaching at a distance. It's basically teaching in different, and hopefully more effective, ways because you have the technology there supporting you. Not understanding that can be one of the reasons why a faculty member will dig in his heels, thinking that, 'I've been teaching this course for 25 years, and I always get good marks from the students. Why do I need to turn it into a PowerPoint?'

> The electronic classroom really calls into question the effectiveness of the traditional teaching process and measures it more on the output side than it does on the input side.
>
> —David J. Ernst

CPU: Do you have a lot of students who are taking courses electronically?

Ernst: We don't have an online degree program per se. We have a significant number of courses that are what we call mixed mode where there is a significant component of the course that has to do with online interaction with faculty. That's where you have access to lectures and references online; where you can get additional course materials, including library materials online; and really try to provide a situation for students to go online to the lecture or get a make-up lecture. But, much of what they otherwise would have gotten out of the learning experience, they can get any time and any place based on having access to the Internet.

CPU: Because there's no direct feedback when students view recorded lectures or live lectures online, does this cut out any important student/teacher dialogue?

Ernst: Most of the times when we have those kinds of situations it's actually associated with either a live, online chat room where all the students have access to a faculty member or a bulletin board where if a student posts a question, a faculty member answers it and everybody in the class sees it. It may happen in real time, during a lecture, or it may happen after the lecture, where the student writes in saying, 'Hey, Dr. So-and-So, I forgot to ask this in class.' There's a lot of that going on—using some of the learning management systems, such as Blackboard, WebCT, and the like—that all of our campuses possess.

CPU: Has the advent of the electronic classroom helped push technology beyond the reach of Third World countries?

Ernst: We have called that in California—and not just in relation to Third World nations—the digital divide. But I think [the digital divide] has narrowed in the past five to 10 years because of where we can provide access to the Internet—even if it's just a single access point that a single faculty teacher has with a computer to get additional reference materials and look at new teaching techniques. I want to note that there's a huge effort underway worldwide in Third World countries to acquire Internet connectivity just so that impact can be felt. I don't want to paint a sugar coating on this, but I think we're seeing some opportunities that exist that didn't exist before with actually less of an investment than you might suspect because of the wealth of information that's on the Internet.

CPU: What are some of the less obvious benefits of the electronic classroom?

Ernst: [The electronic classroom] really calls into question the effectiveness of the traditional teaching process and measures it more on the output side than it does on the input side. You have teacher and student together in an experience where you now have the possibility for the student to have as much access to the information as the faculty may have. What we've seen is a student body that comes to the table to be an active participant in the process in ways they never did when they were just listening to lectures. You're always going to have lazy students and lazy faculty members, but, by and large, the advent of the electronic classroom has developed a sharper edge in both faculty and students to make that experience more worthwhile than it has been in the past.

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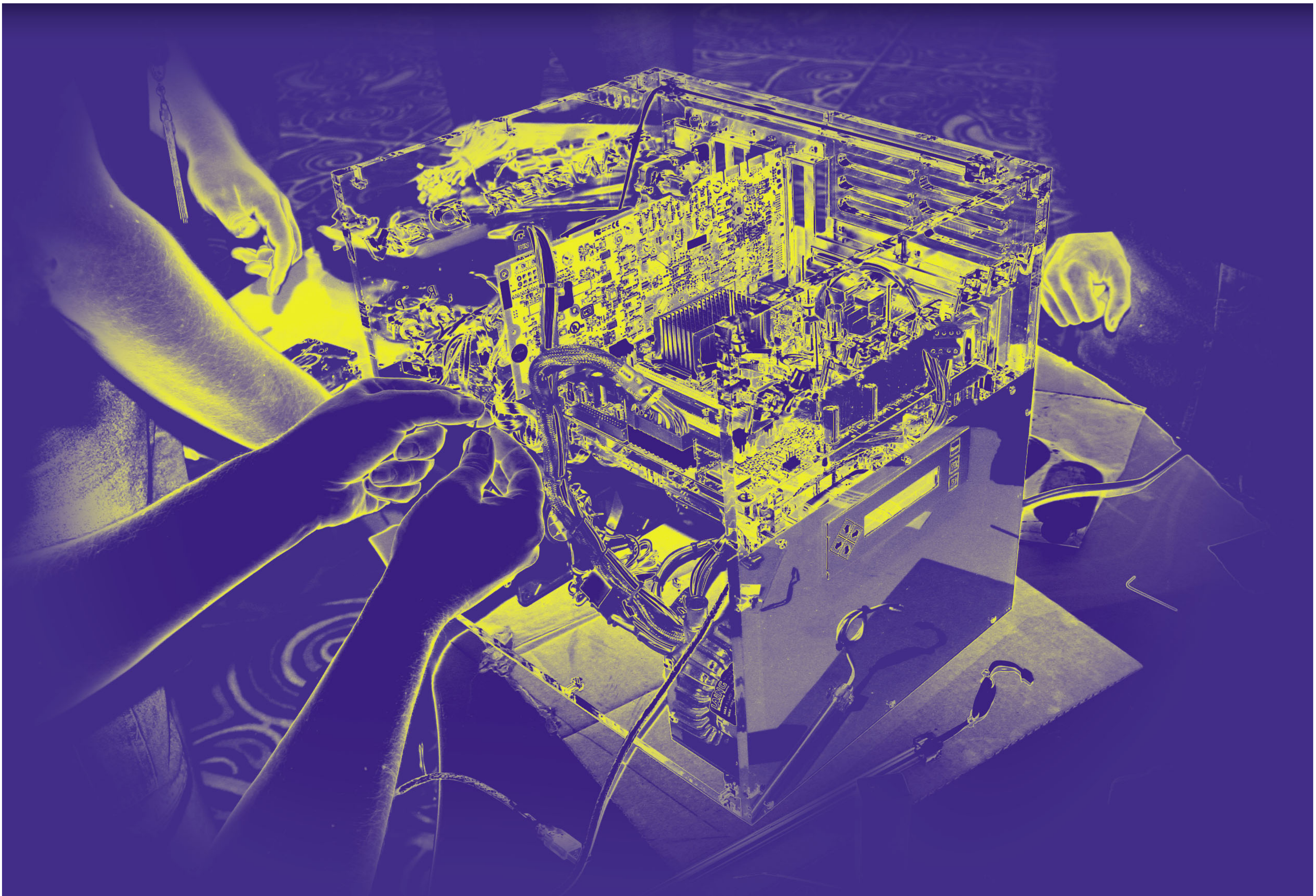

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by Kristina Spencer

Under Development

A Peek At What's Brewing In The Laboratory

Tiny Bubbles On A Chip

Used in drug discovery, chemical analysis, and medical diagnostics, LOC (lab-on-a-chip) devices manipulate extremely small volumes of fluid and perform integrated laboratory functions on a single chip. But the valves, pumps, and other plumbing that direct the liquid flow are currently large and bulky external controls.

Scientists at MIT's Center for Bits and Atoms (cba.mit.edu) have developed a way to integrate the microfluidic controls directly onto the chip, clearing the way for much more compact, true lab-on-a-chip devices. Center director Neil Gershenfeld and his team have been working on "bubble logic," a new logic family which uses bubbles in the chip's microchannels to duplicate the logic of digital circuits.

In bubble logic, a bubble represents a bit of information; the presence or absence of a bubble represents a 1 or 0, respectively. By designing complex channels to direct the bubbles to various locations on the chip and creating logic gates for the bubbles to move through, the system mimics a digital circuit's computing processes and cuts out the need for external mechanical controls to control the fluids.

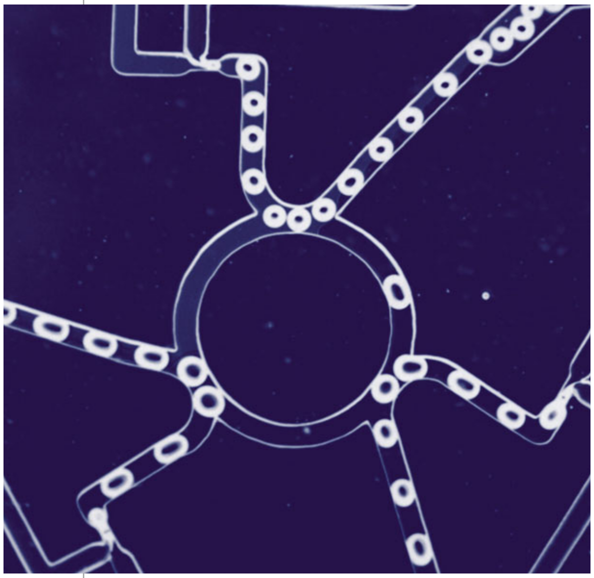


Image courtesy of: Manu Prakash

Microfluidic ring oscillator with three AND gates and delay lines in a ring configuration, showing cascading and feedback implemented in bubble logic devices.

Manu Prakash, graduate student and co-author of the paper that reported the bubble logic research in a recent volume of "Science," explains: "What is unique for bubble logic is the fact that a bit can carry a material payload by embedding inside the bubble/drop, chemical reagents, molecules, cells. Thus, powerful process control operations can be performed on a chip with no external control. The control mechanism and the material/chemicals being controlled are seamlessly merged. This approach leads to merging chemistry and computation."

Although the speed of the bubble circuits is slow in comparison to an average microprocessor—1,000 times slower, in fact—it's still 100 times faster than external controls systems used in today's microfluidic chips.

Prakash says that the team's next steps are to integrate the individual logic modules they've demonstrated (gates, memory, amplifiers, and oscillators) in order to build large-scale devices such as memory arrays and general-purpose chemical processing units. He believes that devices based on the research could be on the market in two to three years. ▲

If Four Cores Are Good, 80 Will Surely Rock

What do photo-realistic gaming, live 3D video communications, and artificial intelligence programs have in common? All require huge amounts of speedy data processing to become readily available to the average consumer.

But chip performance that could make those technologies viable is now one step closer. Researchers at Intel have announced the development of an 80-core chip capable of achieving teraflop performance. Just as notable, the chip achieves this remarkable milestone while consuming only 62 watts—less electricity than many of today's processors. To further put that staggering figure in perspective, 1996 was the first time teraflops performance was achieved, when it took a 2,000-square-foot supercomputer powered by 10,000 Pentium Pro processors to achieve it.

Each core on the chip contains two floating-point engines, as well as a 5-port message-passing router, which allows for high-bandwidth communications inside the chip itself. The cores are small and arranged in a tile design, which can quickly and easily be replicated across the chip.

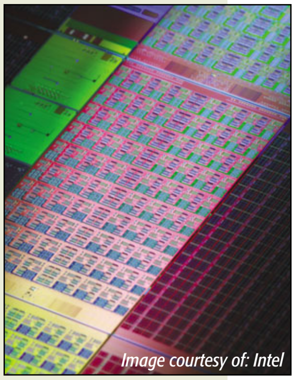


Image courtesy of: Intel

Although Intel does not intend to bring this specific research chip to market, its development provides a starting point for continuing to research energy-efficient multicore design, chip-to-chip/computer interconnects for transferring large amounts of data, and software design changes to utilize multiple processor cores.

In a recent Intel press release, Justin Rattner, Senior Fellow and chief technology officer notes that the research milestone "points the way to the near future when teraflops-capable designs will be commonplace and reshape what we can all expect from our computers and the Internet at home and in the office." ▲

Remote Control Your Desktop

You're at a conference and realize that the perfect illustration of a point you're trying to make sits in a file on your desktop computer at work. Or, you are meeting some potential clients and remember that a crucial piece of data you need to make your pitch is sitting in your Outlook inbox. If only you had a way to search for and access that info easily and securely, no matter how far away you were from a workstation . . .

If you have your cell phone available, you might eventually be able to do just that. Researchers at Fraunhofer Institute for Secure Information Technology in Darmstadt, Germany, have developed such a system with a project they call MIDMAY (Mobile Information Distribution Management and Access for You).

MIDMAY uses a "home base" server to access data on the user's workstation. The server's software extracts the structure the user has given the data and uses it to interconnect pieces of information it finds. For example, an email attachment would be linked with calendar data, letting a user include date parameters to narrow down a search for the attachment. The software automatically interlinks data, independent of its original format, and requires no additional tagging or sorting from the data's owner.

The second piece of the system is the mobile phone software, which allows a user to search for and manipulate the data on his workstation.

The project team, which is managed by Jens Heider, is designing an interface that accesses the correct data in as few keystrokes as possible.

"Currently, we are working on further improved user interfaces for mobile devices and PCs," says Heider. "These will have better visualization capabilities to improve . . . intuitive usage."

In order to safeguard a user's personal data, MIDMAY utilizes multiple layers of security, which include the following: encrypted data storage, separation of access privileges, and user authentication based on digital certificates.

Image courtesy of: © Fraunhofer SIT

The MIDMAY project will give a user access to the information on a workstation using a cell phone as a remote control.

Heider says that the first commercial application of the technology is about one year away, although parts of the technologies they're developing may appear sooner in other applications. ▲

Soft-Bodied Robots

Over the past several years, robots have begun to fulfill some of the promises forward-thinking sci-fi visionaries have imagined. Robots can vacuum your floor, suggest a wine, help perform surgery, and safely detonate land mines. But because the current crop of robots consists of rigid materials, there are limitations to the places they can go and the types of movement they can perform. This restricts their utility in confined or otherwise difficult spaces.

At Tufts University, a group of researchers are looking to nature to guide them in developing a new class of robots that will utilize soft and flexible materials and move like a worm or caterpillar to access spaces that hard-bodied robots can't. Led by biology professor Barry Trimmer and biomedical engineering professor David Kaplan, the interdisciplinary Biomimetic Technologies for Soft-bodied Robots project brings biology, bioengineering, and micro/nano fabrication to research these issues.

The prototype robots resemble a caterpillar and are composed of strong and flexible "fusion protein" fibers that Kaplan developed. The fibers combine the strength of spider silk with the structure of silica. They can flatten and will be able to climb textured surfaces, crawl along ropes, and burrow into twisting spaces.

The flexible robots could eventually have many practical applications, such as exploring the human body to aid in medical diagnoses, or maneuvering through situations to complete tasks that are too hazardous for humans, such as working in a nuclear reactor or disarming a mine field. ▲

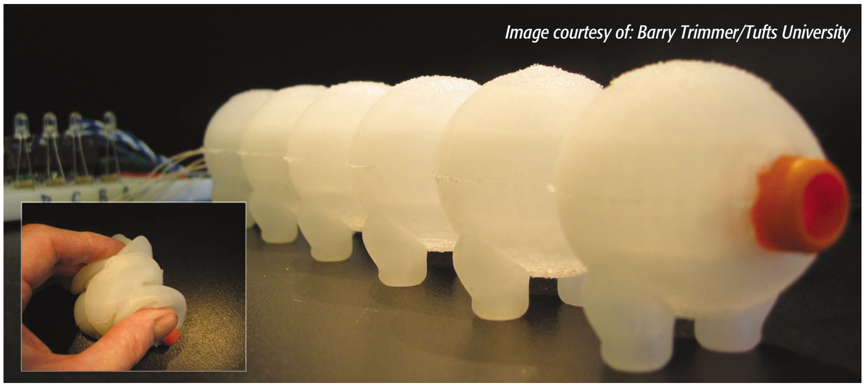


Image courtesy of: Barry Trimmer/Tufts University

Because of their flexible construction and fluid movement, soft-bodied robots could provide access to complex, tight spaces.

Q&A With Trip Hawkins III

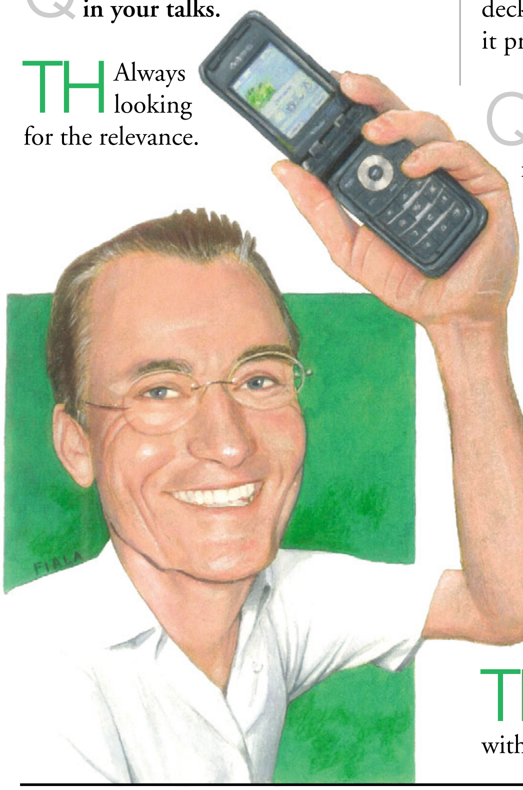
Trip Hawkins III has weathered a lot of cycles in the technology industry. He was an early employee at Apple Computer. He founded game publisher Electronic Arts in 1982 and guided it for almost a decade. In 1991, he founded 3DO, the ill-fated maker of the 3DO Multiplayer game console. In 2003, Hawkins started cell phone game publisher Digital Chocolate. Hawkins recently gave a Game Developers Conference keynote speech on how social networking is turning cell phones into the "new hearth."

Q **What do you mean by the new hearth?**

TH We have always been social beings. We started with campfires. That was the social hearth. Then it was fireplaces. Then it was the TV. Now you have the new social hearth in the palm of your hand.

Q **You've always been a sociologist in your talks.**

TH Always looking for the relevance.



Q **It's part of your job to know about the social landscape?**

TH It's part of me. Part of my values. Ever since I was a kid, I've been looking for meaning in life. Everybody wants to play in forums that are more accessible and social. In the mobile space, simple forms of gaming can drive the social connection.

Q **So a social insight can help direct your game design?**

TH Absolutely.

Q **Is it already clear that a socially connected game is more likely to hit the top of the charts?**

TH If you want to count SMS, text messaging, as a social application, then I would say so. SMS is light years ahead of everything in mobile. You don't download it from a deck, so it isn't the same category. But it proves the point.

Q **Are you waiting for more direct proof that everybody will pay for a game that they download to a phone?**

TH This is where we are on the bleeding edge. Downloading games can be difficult and clunky. It is becoming easier to do. Just as it happened with the Internet, I take it as an article of faith that all of those people will become downloaders in the future.

Q **What is the lost village?**

TH It's what we've lost in the last 100 years. We used to grow up with family and knowing our neighbors. Now we've moved away into big, impersonal cities. We're socially isolated. We're away from families and don't know our neighbors.

Q **And everything we do is aimed at trying to relieve our social isolation?**

TH Technology happened so fast. There were so many industrialized inventions that people thought they wanted. It evolved our social structure so fast that, in the case of global warming, we outran the planet's resources. In terms of social stuff, we had a little arrogance in thinking we're all logical, rational, and that we can make scientific choices about a new technology.

Q **You say the hearth is in your hand. How is that different from the hearth being in the fireplace or the television?**

TH Look at the way this first got observed. You've seen the pictures of people on a Japanese subway. They're huddled around a little tiny screen because they need to feel a connection to their friends on the other side of that lifeline. They don't have a party with the people on the train because they don't know those people. This is being repeated everywhere.

Q **If you have social insights that cell phone game designers should know about, what would those be?**

TH The AvaPeeps game we launched was a social application. I created an avatar (for dating). Wow, was I surprised. A day later, I had 15 avatars asking me for dates. I checked the leader boards and one guy had gone on 126 dates. We just launched it two days earlier. One couple had already had 28 dates. The users have it open all the time and go on speed dating. It's very exciting to see such behavior. ▲

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